BRITAIN'S BEST-SELLING MACINTOSH MAGAZINE

MACFORMAT

ISSUE 45 ▪ CHRISTMAS 1996

US$10.95 ■ HFL 21,50 ■ £5.00 elsewhere outside UK & Eire Also available with CD-ROM

DESKTOP VIDEO!

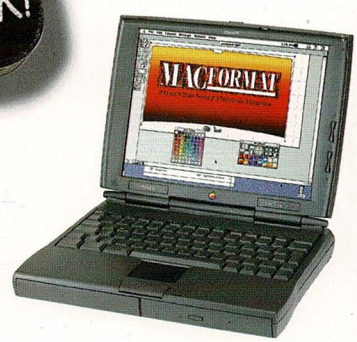
TAKE 1

- DISCOVER HOW EASY IT CAN BE TO EDIT VIDEO ON YOUR MAC - TRY IT YOURSELF WITH OUR COVER DISK
- LEARN HOW THE BBC & CHANNEL 4 USE MACS TO MAKE PROGRAMS

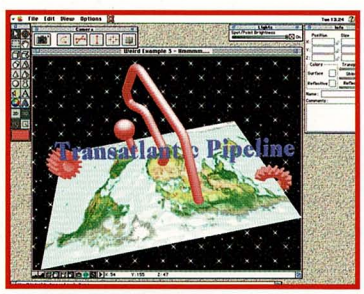
THE SOFTWARE YOU NEED IS ON THE COVER DISK!

Get the big picture

This card will give your Mac more colours, a bigger display, faster graphics, *and* 3D, all for under £250! Could you do better? Find out in our big group test of graphics cards inside!



3D World 2



The easiest, most affordable 3D package, or not quite enough?

New Power-Books tested!

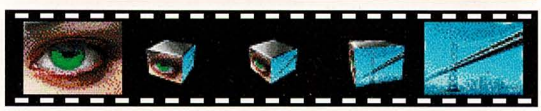
The 1400 series is here, with fast PowerPC chips, CD drives and much more, for much less cash! So how do they perform?

PLUS QuickCam – the easiest way to get video into your Mac? ■ How to add effects to digital sound or video ■ Mac problems solved ■ The latest games and multimedia reviewed

Worms

Can this unique arcade-style game make strategy fun again?

MACFORMAT DISK 45 XMAS '96



QuickEditor 3.6 – Try your hand at desktop video editing and effects!

PLUS Aaron 1.5.1 + Hi-Tech Patcher ■ ePress 4.0 ■ FastPlayer ■ MacDim ■ Power Windows 1.2.1 ■ Arcade action with Bert 1.1

Over 3.1Mb of great software!

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	8500/180	180	16Mb	2Gb	✔8	£2399	PRICE CRASH!
NEW	9500/200	200	0Mb	0Gb	✔8	£2149	
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MHz	RAM	HD	MODEM	MONITOR	CD	TV	K/B	Price
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180	16Mb	1.6Gb	✔28.8	14" M/S	✔8	✘	✔	£1479
180	16Mb	1.6Gb	✔28.8	15" M/S	✔8	✘	✔	£1549
180	16Mb	1.6Gb	✔28.8	15" AV	✔8	✘	✔	£1599
200	16Mb	2.4Gb	✔28.8	✘	✔8	✘	✘	£1469
200	16Mb	2.4Gb	✔28.8	14" M/S	✔8	✘	✔	£1749
200	16Mb	2.4Gb	✔28.8	15" M/S	✔8	✘	✔	£1829
200	16Mb	2.4Gb	✔28.8	15" AV	✔8	✘	✔	£1879

THE APPLE CREATIVE STUDIO AVAILABLE SOON!

MHz	RAM	HD	MODEM	MONITOR	CD	TV	K/B	Price
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PERFORMA 6320

FREE DK SAMPLER

6320, 12/1200,CD

£779

JUST £6.18 PER WEEK

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- 12Mb RAM/1.2Gb Hard Drive
- Keyboard Options • Eight Speed CD
- System 7.5 • Disney Plus 3 Software

	RAM	HD	MODEM	MONITOR	CD	TV	K/B	Price	
	12Mb	1.2Gb	✘	✘	✔8	✘	✘	£779	PRICE CRASH!
	12Mb	1.2Gb	✘	14" M/S	✔8	✘	✔	£1049	
NEW	12Mb	1.2Gb	✘	15" M/S	✔8	✘	✔	£1089	
	12Mb	1.2Gb	✘	15" AV	✔8	✘	✔	£1139	

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5300cs/100, 8/750

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1400c/117 16/1000 CD AM	£2449
1400c/133 16/1000 CD	£2799

1400s SUPPLIED WITH... Claris Works, Claris Organiser, Route 66, Apple Internet Connection Kit, ARA, GSM Conn. Kit

POWERBOOK DUO RANGE... £CALL

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NEW RANGE!

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1400 A/C Adaptor	£39
1400 Battery	£69
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FANTASTIC NEW ACCELERATORS TO MAKE YOUR MAC FLY! for PowerMac 7500, 7600, 8500 and 9500 Models

- 166MHz £399 • 180MHz £499
- 200MHz £649 *Available Soon CALL GH NOW!*

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- VIDEO-IN CARD - £89 VIDEO-OUT CARD - £219
- VIDEO-IN TV TUNER CARD - £219
- MPEG FMV VIDEO CD PLAYBACK CARD £175 *(only fits 630 models without a DOS Card)*
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- APPLE INTERNET CONNECTION KIT - £47

FOR PERFORMA 5400 AND 6400 MODELS ONLY

FOR 5400/6400s

- VIDEO-IN CARD £69
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Apple RISC 604, 132MHz U/G (7500/8500/9500)	£638
Apple 486, 66MHz DOS Card	£169
Apple 586, 100MHz, 8Mb DOS Card	£489
Apple Pentium 100MHz, 8Mb DOS Card	£610
Apple 3D Accelerator Card & 3D World Bundle	£279

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BUSINESS FINANCE : Weekly rates shown exclude VAT and are based on a fixed cost 3 Year Apple Commercial Credit Lease payable quarterly after an initial deposit payment. Available to all businesses (including recently established) making a minimum total purchase from GH of £750 - subject to status. FULL Details available on request.

Manufacturers' specifications and GH prices are correct at time of going to press; however, they may fluctuate and we therefore reserve the right to amend them - please confirm prices before ordering. This advertisement is an invitation to treat, not an offer to sell. Goods are not supplied on a trial basis. All transactions are subject to Harwood's Terms and Conditions of Sale, a copy of which is available on request. E.&O.E.

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Apple 14" MultiScan (.28)	£225
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Apple 17" 1705 MultiScan (.26)	£499 PRICE CRASH!
Apple 17" 1710 TCO Trinitron MultiScan (.26)	£659
Apple 17" 1710AV TCO Trinitron MultiScan (.26)	£729 PRICE CRASH!
Apple 20" Trinitron MultiScan II (.26)	£1199 PRICE CRASH!
NEC 15" CromaClear Multisync (.25)	£399
NEW Mitsubishi 17" Diamondtron Multisync (.26)	£599
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Sony 15" SX1 Trinitron Multisync (.26)	£299
Sony 15" SF2 Trinitron Multisync (.26)	£339
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Sony 17" SE2 Trinitron Multisync (.26)	£779
Sony 20" SF2 Trinitron Multisync (.26)	£1149
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GH Prices INCLUDE Adaptors for non Apple Monitors FREE!

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Apple Adjustable Keyboard	£139

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Epson Stylus Pro XL+ Colour - A3 720 x 720dpi	£829 PRICE CRASH!
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HP 660C DeskWriter Colour 600 x 300dpi	£229 PRICE CRASH!
HP 870Cxi DeskWriter Colour 600 x 600dpi	£329
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StyleWriter 1500	Colour Cartridge	£23
StyleWriter 2400/2500	Black Cartridge	£26
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	Black Ink Tank	£7
	Colour Tank	£13
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Epson Stylus 500	Black Cartridge	£15
	Colour Cartridge	£24
Epson Stylus II	Black Cartridge	£14
	Colour Cartridge	£20
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Apple CD 600i Plus Internal Quad Speed (Requires fitting kit - please call for details/price)	£189
Panasonic Double Speed inc. Cables*	£89

(*Standard Cables for Desktop Macs, call for PowerBooks*)

SCANNERS

Apple Color One 600-27 Scanner	£399
Apple Color One 1200-30 Scanner	£499

UMAX

Model	Photoshop	Trans Adap	Price
VISTA S6e	✘	✘	£219 PRICE CRASH!
VISTA S6e	LE	✘	£239
VISTA S6e	FULL	✔	£649
VISTA S12	✘	✘	£399
VISTA S12	LE	✘	£419
VISTA S12	FULL	✘	£519
VISTA S12	FULL	✔	£844

UMAX Vista Transparency Adaptor	£329
TextBridge bought with any Umax scanner	£39

AGFA

Model	Software	Trans Adap	Price
SnapScan	ColorIt/Omnipage	✘	£249 PRICE CRASH!
StudioScan IISi	Photoshop LE	✘	£439
StudioScan IISi	Photoshop FULL	✘	£499 PRICE CRASH!
StudioStar	Photoshop LE/Omnipage	✘	£559

EPSON

Model	Photoshop	TextBridge	Price
GT 5000	LE	✔	£279
GT 8500	LE	✔	£449
GT 8500	FULL	✘	£549
GT 9500	LE	✔	£579
GT 9500	FULL	✘	£689

Epson Transparency Adaptor (except 9500)	£399

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SCSI Adaptor for Paperport VX	£49
4 Port Juggler for Paperport/Modems	£89

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QuickTake 100 to 150 Upgrade Lens	£13
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Kodak DC25 Digital 2Mb, PCMCIA, LCD	£319
Kodak DC40 Digital 4Mb, Flash, 99 Images	£419
Kodak DC50 Digital 1Mb, PCMCIA, 3 x Zoom	£599 PRICE CRASH!
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Connectix QuickCam Colour	£159

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D2, Quantum, 2.1Gb External Hard Drive	£339 PRICE CRASH!
EZ135 Drive - inc. Cartridge & Cable	£119
EZ135 Cartridge	£14
EZ230 Drive - inc. Cartridge & Cable	£219 PRICE CRASH!
EZ230 Cartridge	£29
IOMEGA 100Mb ZIP Drive - inc. Cartridge & Cable	£125 PRICE CRASH!
ZIP Cartridge - 100Mb	£11
ZIP Cartridges - 100Mb, 6 PACK	£54
D2 JAZ Drive Inc. Cartridge & Cable	£299
D2 JAZ Drive Inc. 3 Cartridges & Cable	£469
IOMEGA JAZ Drive Inc. Cartridge & Cable	£339 PRICE CRASH!
JAZ Cartridge - 1Gb	£69
JAZ Cartridges - 1Gb, 3 PACK	£195
D2 200Mb Syquest Drive - inc. Cartridge	£319
Syquest Cartridge - 44Mb	£28
Syquest Cartridge - 88Mb	£30
Syquest Cartridge - 200Mb	£45
Syquest Cartridge - 270Mb	£34
D2 230Mb Optical Drive - inc. Cartridge	£399
Optical Disk - 230Mb	£20
Pinnacle 2.6Gb Optical Drive inc. Cartridge & Cable	£1099 WHILE STOCKS LAST!
SONY CD WRITER Double Speed - Write, Quad Speed Read including Toast or Gear Software	£599
YAMAHA CD WRITER Quad Speed - Write, Quad Speed Read including Toast or Gear Software	£725
PINNACLE RCD 5040 CD WRITER inc. Software	£649

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Artpad II... £109 Artpad II with Dabbler... £150

Ultra Pad... A5 - £255, A4 - £355, A3 - £555

COMMS

Apple 28.8 GeoPort II FOR POWERMACS	£109
Apple Personal COMMs Solution - 14.4 £109 28.8	£179
(For 630/5200/5260/5300/5320/6200/6300/6320, see 'Performa Options' below left)	
Motorola 28.8 3400 Pro V34	£115

FREE £100 HOLIDAY VOUCHER WITH 3400 PRO (Hurry while stocks last!)

Lasat Safire - 28.8	£139
US Robotics Sportster 28.8 V34	£149
Global Village TelePort Gold II - 14.4 BABT	£49
Global Village TelePort Platinum - 28.8 BABT	£129
Global Village PowerPort Gold PCMCIA 14.4 BABT	£189
Global Village PowerPort Platinum PCMCIA 28.8 BABT	£239
Psion Dacom Gold Card - PCMCIA BABT	£179
FAX Friend- Auto switch between FAX/Voice calls	£49

FREE INTERNET access software via Compuserve with ALL Modems!

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SIMMs... 4Mb £20, 8Mb £35, 16Mb £79, 32Mb £169, 64Mb £299

DIMMs... 4Mb £29, 8Mb £39, 16Mb £79, 32Mb £149, 64Mb £329

Memory Prices Fluctuate Daily, Call GH FIRST!!!

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Corel Draw Suite (Corel Draw + Word Perfect)	£279	M.Y.O.B. Accounts	£149
Corel Draw Suite UPGRADE	£99	MacMoney	£62
Quark Xpress 3.3	£649	Complete After Dark CD	£34
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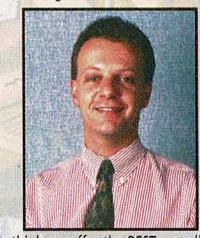

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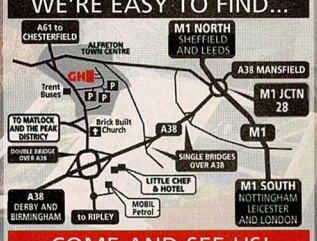

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MACFORMAT
ISSUE 45 ■ CHRISTMAS 1996

The Finder

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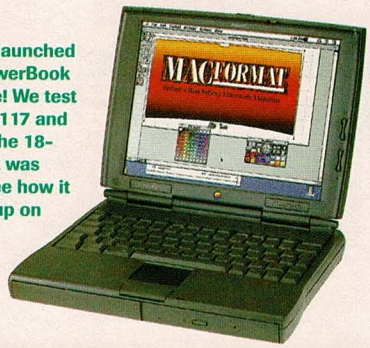
Apple has launched its new PowerBook 1400 range! We test the 1400c/117 and find out if the 18-month wait was worth it. See how it measures up on page 66.



Mean, slippery – and armed with bazookas! Killer worms, page 102.

Sculpt away! – interactive and affordable 3D, page 72.

Buyer's Guide

The Chooser 113

Packed out! 32 pages of great buying advice, hot product news, and, above all, dozens of the best Mac products to help you choose wisely. Plus: look up all the details on your own model of Macintosh.

Free Reader Ads 132

Pick up the best bargains in our Mac marketplace. Software, hardware and everything in between!

Win! Win! Win!

Two chances to win with MACFORMAT this issue, with prizes worth thousands of pounds!

Every Grolier title released till the end of the century! 136

Win 11 top titles initially – worth over £500 – and then win every Grolier release for the Mac until the year 2000!

Umax S-12 scanner 138

This great colour scanner boasts all you need to get A4 images into your Mac, it's worth over £900, and you could win one!

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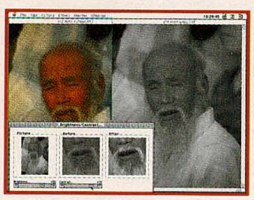

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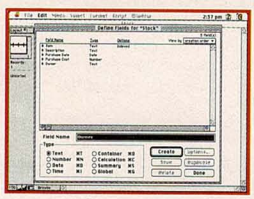

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ON THE CD

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Be patient, there's just four weeks to wait for the next one.

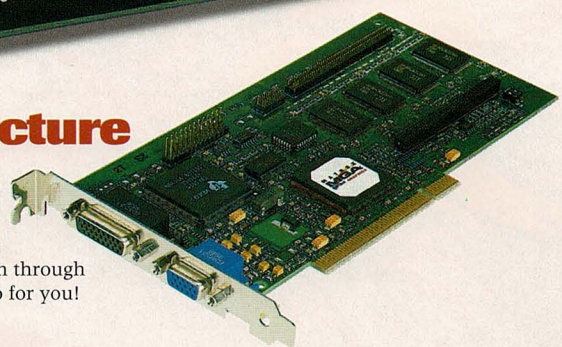
DESKTOP VIDEO!
TAKE 1
• DISCOVER HOW EASY IT CAN BE TO EDIT VIDEO ON YOUR MAC - TRY IT YOURSELF WITH OUR COVER DISK
• LEARN HOW THE BBC & CHANNEL 4 USE MACS TO MAKE PROGRAMS
THE SOFTWARE YOU NEED IS ON THE COVER DISK!

Lights, camera, Macintosh!

page 30

You don't need a lot of money and Hollywood-style technology to create video these days. Mac-based digital editing is transforming film and television – and our guide will show you how to use our Cover Disk programs to produce a DIY video too!

Get the big picture



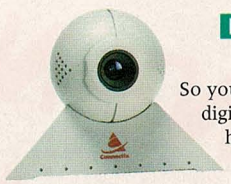
Graphics cards, page 58

Want to add more colour and detail to your screen? Then play your best hand by introducing your monitor to a graphics card. Our group test puts them through their paces – find out what they can do for you!

Alps MD-2010 printer

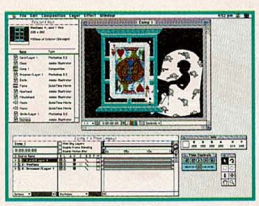
page 68

The Alps MD-2010 claims to give you "photo-realistic", smudge-proof colour and even the option of metallic ink, all at a very affordable price – using a special Micro Dry ™ ink technology. So does it do what it promises?



Digital video tools

So you like the sound of this digital video stuff, but how do you get video into your Mac, and what can you do with it then? Here are two answers: the novel, affordable QuickCam Color (page 70) and *Adobe After Effects 3* and *KPT Final Effects* for adding special effects (page 74)



MacFormat Cover Disc

MacFormat is available in your choice of a CD-ROM or a high-density floppy disk edition every issue:

This logo in the mag means programs on the CD.

Your Cover CD-ROM 8

Be the producer, director and editor with our 120Mb of video editing and effects software. Plus: rediscover the fun of the arcade with 15 top games; demos and previews galore including *Worms*, *WarCraft II* and *The Way Things Work 2;* game updaters; essential System extras and over 120Mb of the very latest shareware from the Internet, plus everything below...

Create your own QuickTime movie with *QuickEditor* – it's on the CD and floppy!

Your Cover Disk 12

Try your hand at Desktop video editing with *QuickEditor 3.6*. Plus: Finder Enhancers, an electronic business-card creator and our favourite classic arcade game, *Bert!*

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PowerBook 1400c/117 66
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A new "dry ink" technology that promises better than inkjet quality? We take a look...

Connectix Colour QuickCam 70
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This interactive 3D modelling package is not only powerful, it also seems to offer great value. So what's the catch?

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Welcome to MACFORMAT

Everything you wanted to know about MACFORMAT, plus our view of "Desktop video" today and into the future...

About our writers

Richard Hill

Our News editor is always looking out for new uses for Macs, and he's a film buff as well, so he's eagerly awaiting the day when we won't be just watching PowerBooks in films like *Independence Day* but watching films like *Independence Day* on PowerBooks. But to do them justice, they'd need *really* big screens...

Lindsay Bruce

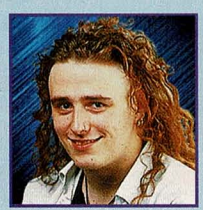
Our Technical Writer has been testing graphics cards this issue, so he'd like to see cards that give every Mac the ability to play MPEG movies from CD, digitise and output full-screen, full-motion 30 fps video and 16-bit sound, plus a serious authoring, editing and graphics tool so you can make your own *ID4*. "But hey, I'd settle for a 9500/180 MP if I can't have that."

Derek Smith

Our technical expert and company troubleshooter recently listened as a couple of gamers gasped in awe at the video intro sequence to *Wing Commander 3*. It didn't bother them that the quality was vastly poorer than, say, *Star Wars*. So if people prefer poor substitutes as long as they're on a computer, he says, QuickTime has a secure future. So does the Internet.

Rod Lawton

It takes a lot to impress our "productivity software" specialist, but he does grudgingly admit that Desktop video does open up the exciting possibility of almost everyone creating their own films. But then, if you think back to what happened when everyone got into DTP, it could just mean that we're due for a flood of crap videos with poor colour and far too many fonts.

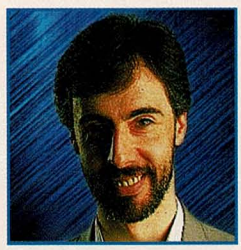


Hairy

Our acting Disc Editor says he's waiting for Desktop videophones, ideally with a camera built into his PowerBook. "There may be serious room for hanging-computer-out-of-window type japes, or at least motion sickness for anyone who dares to call me. Or how about some swift video editing, so bits of me could pitiably drip off when my mother calls? And then there are all those blue-screen possibilities..."

Ian Waugh

Our rather more practical music specialist has actually worked with digital media, as his continuing digital effects series proves. It's definitely the way forward for music and video, he says, so long as you can afford the gigabytes of storage space it takes. And the Mac is definitely the machine to choose for the best tools too – the PC gets just the dregs and leftovers...



Alex Summersby
Editor

Welcome again to MACFORMAT, Britain's best-selling Macintosh (and Mac-compatible!) magazine.

If there's a theme to this issue, it must be the way hugely powerful technologies are increasingly becoming available to all. Desktop video is a good example. Not more than a couple of years ago, it was an exciting but prohibitively expensive area – it required gigabytes of storage space at a time when that was expensive, and proprietary systems to view and edit digitised footage. Now, QuickTime has advanced so far that full-screen, full-motion video is a real proposition, and even an entry-level Mac comes with over a gig of hard disk – not to mention a PowerPC chip with built-in Digital Signal Processing capabilities. Brilliant gadgets like the colour QuickCam make video input affordable, and the software too has become increasingly accessible – so much so that we can include a fully-working QuickTime editing suite on our floppy disk edition as well as on our Cover CD-ROM.

Then there's the gorgeous new PowerBook 1400, bringing portable computing within reach for all. And *3D World* can put 3D on the desk of anyone who has any PowerMac.

Of course, not everyone has an up-to-date machine. Even if you do, you may want to do more than it can deliver – like perhaps display more colours or drive a bigger monitor. Here too, solutions are becoming more accessible, like a plug-in card that can give you all that and more for under £250.

When the Macintosh was launched, they touted it as "the computer for the rest of us", the computer you could use without having to understand computing. Today, increasingly, it's becoming the computer for *all* of us.

About MACFORMAT

MACFORMAT is for you, the person who actually works at a Mac keyboard. Every issue we bring you:

- **Tips, techniques and tutorials** covering the range of Mac applications, from graphics, spreadsheets and databases to music, multimedia and games.
- **Features** about exciting Mac developments and novel uses, accompanied by software on our Cover CD-ROM and floppy disk whenever possible, so you can discover what your machine can do and try things you mightn't have tried before.
- All the latest Mac-related **news,** plus all you want to know about the wider issues, the people behind the headlines and the stories behind the stories.
- Authoritative, independent **reviews** of interesting and affordable products, with clear buying recommendations.
- **Cover Disks and CD-ROMs** with demos so you can try software for yourself before you buy, useful utilities (specially chosen to complement features in the magazine), selected shareware programs, games, readers' contributions and much more.

Whether you're a veteran or a novice, MACFORMAT will help you get more out of your Macintosh, whatever you use it for.

A word about prices...

We try to ensure that all prices quoted in editorial pages in MACFORMAT are accurate at the time of going to press, and they all *include* UK Value Added Tax at 17.5%. However, this may not necessarily be the case with prices appearing in advertisements, so we recommend that you always contact advertisers before ordering to confirm prices and availability.

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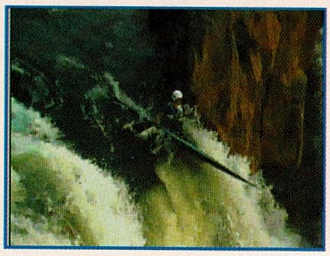
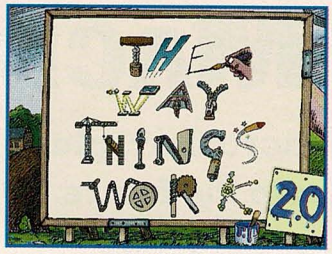
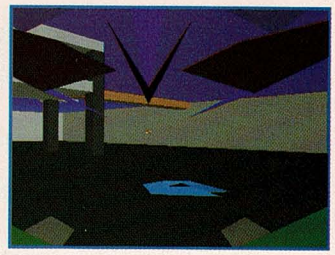


Four Palms sample movies



The Way Things Work 2.0

Worms



Avara

Your CD-ROM

This issue's CD is not only packed full of the latest great shareware and demos, but we also have some truly wonderful games. Stand back and let Derek Smith guide you through it.

Getting started

Welcome to the MACFORMAT 45 Cover CD. Here are some tips:

- **Some of the demos on the Cover CD require installation on your hard disk – they won't run direct from the CD. Many of these programs use an installer: once you've double-clicked on it, just follow the on-screen instructions and you should be fine. Even if there's no installer, it often helps to copy demos to your hard disk – at the very least they should run faster!**

- **The icons we use on the CD folders help to give it a friendly atmosphere, but they do slow it down. Install *CDIconKiller*, which is in the Resources folder on the CD, if you want to speed things up.**

- **If you have problems quitting any of the rolling demos on the CD, just press [command] Q and you should go back to the Finder. If this doesn't work, hit [command] [option] [escape] to Force Quit.**

- **It couldn't be easier to install System Extensions and Control Panels – just drag them over your closed System Folder and your Mac puts them in the right place for you. Then all you need to do is Restart.**

- **Look for this icon throughout the issue – it will point you towards the CD contents connected with the feature or review you're reading.**

ON THE CD

Desktop video

What is it? Video editing software
Where you'll find it: On the CD
Requires: see individual programs

In this issue's spectacular cover feature we show you how to get into Desktop video. But words can only tell part of the story. For a subject like this you need to see what it's all about, and in this folder you'll find a collection of movies and programs to test for yourself.

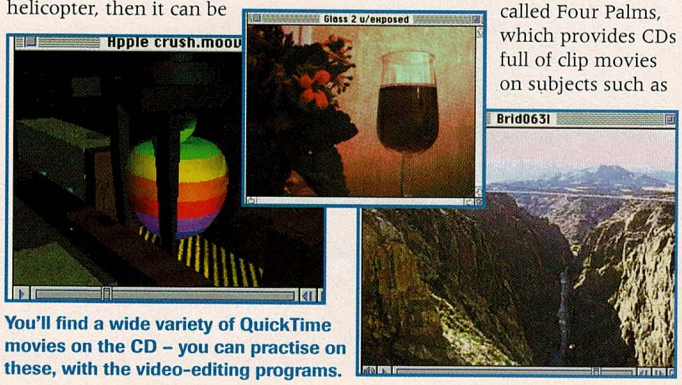
For instance, in the *Classic CD* folder you'll see a video produced here at Future Publishing to promote our classical music magazine. Don't worry if classical music isn't your scene, this video demonstrates many of the ideas and techniques that we discuss in the cover feature – and you can run it directly from the CD.

Editing movies is one thing, but actually creating them in the first place is quite another. If you want a video sequence of someone flying down the Grand Canyon in a helicopter, then it can be rather expensive to produce yourself. Thankfully, an increasing number of companies are providing clip movies.

This Media 100 movie ignores all the "rules" about overdoing special effects and launches an attack on your senses, accompanied by the sound of "O Fortuna" (the Old Spice theme).

Don't look at the *Classic CD* video as an blatant advert. Instead, think of it as an example of what you could aspire to in this field.

Like clip art, these movies are of general subject matter that you can incorporate into your own movies. On the Cover CD we have some sample movies from a company called Four Palms, which provides CDs full of clip movies on subjects such as rail, sports and aviation. You can run the demos directly from the CD and see some of the sample movies, before re-editing them yourself!



You'll find a wide variety of QuickTime movies on the CD – you can practise on these, with the video-editing programs.

There's a surprising amount of shareware QuickTime software out there, and perhaps more surprising is the excellent quality of a lot of it. You'll find 26 of the best utilities in the **Movie Shareware** folder and the superb *QuickEditor* in the Floppy folder (see page 12). If you don't have QuickTime installed on your Mac, the latest version, 2.5, is in the **Desktop Video** folder too.

Dorling Kindersley Sampler

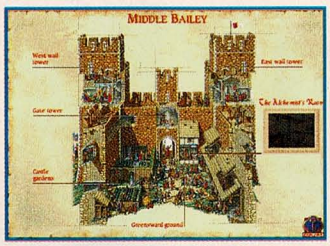
What is it? Rolling previews
Where you'll find it: Demos folder
Mac: LCIII or better
PowerMac: any
Requires: 1Mb of free RAM, 4Mb recommended

Dorling Kindersley is famous for producing children's books which can be found the world over – and in most shops you'll now see the multimedia versions sat next to the books on the shelf.

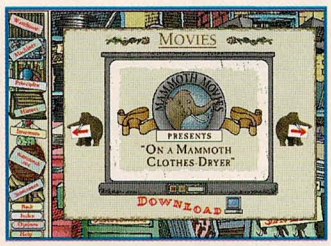
With its experience of making interesting and absorbing books, DK has exploited the world of the multimedia CD-ROM to the full. Its titles contain lots to keep children interested, and are presented in a fun way.

We review two of their new releases in this issue (see page 94), and we have rolling previews of both on the CD.

Castle Explorer is a exquisite look at what life would have been like in the middle ages. DK's *The Way Things Work* has been a terrific best seller, and the sequel seems destined for the same success.



Get a real insight into life in medieval times with our superb demo of DK's *Castle Explorer.*



Find out more about the world around you, in our rolling demo of *The Way Things Work 2.*

To Install

Both of these rolling demos can be run directly from the CD, so just double-click on their icons, sit back and enjoy the show.

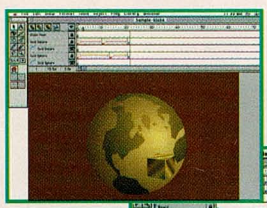
Future Splash Animator

What is it? Time limited demo
Where you'll find it: Demos folder
Mac: 68030
PowerMac: any
Requires: 7.5Mb free RAM

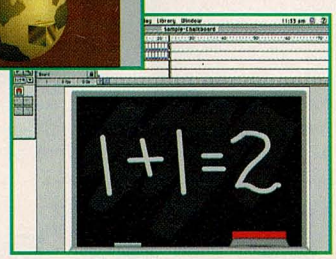
Not the most catchy product name in history, but the premise for this software is very interesting. Essentially this is a program to create animations. You can use it to create simple slide shows, interactive presentations with buttons or moving animations.

In itself, that's not revolutionary, providing features similar to the *Apple Media Tool* that we gave away on the MACFORMAT 36 Cover CD.

Where this program comes into its own, however, is by giving you the power of, say, *Macromedia Director* – but making it very simple to use. To read a full review, turn to page 86.



Create your own animations for publication on the Internet with *Future Splash Animator.*



It really is as simple as it looks. To get started in animation, try out the Lessons in the Library menu.

To Install

Running the Installer program from the CD will install everything you need on your hard disk. There are very extensive instructions on how to use the program available by choosing **Lessons** from the **Library** menu.

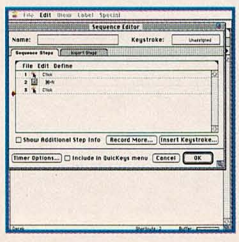
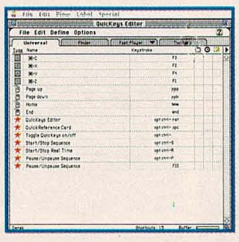
QuicKeys

What is it? Time limited demo
Where you'll find it: Demos folder
Mac: LC or better
PowerMac: Any
Requires: System 7.5 or later

You can record music, you can record video, and now you can record your Mac too. *QuicKeys* is a program to create macros – replayable recordings of whatever happens on your Mac, such as mouse clicks, typing, and pull-down menu selections.

This program won't be useful to everyone, but if you've ever been in the situation of repeatedly performing the same series of tasks because there was no alternative, then give this a go. The demo is fully functional, but time-limited, enabling you to use it for 30 days.

Once it's installed, you'll see a new menu just to the left of the **Help** menu. Go to that menu and select **Record Sequence.** Perform the actions that you would like recorded – don't worry, it won't record your pauses – and once finished, select **Stop Recording** from the **QuicKeys** menu. You'll now be asked to give that recording a name and a keyboard shortcut – for instance, the **F9** key. Now whenever you press **F9,** your recording will be played back.

Automate any program, including the Finder, with the latest version of *QuicKeys.*

To Install

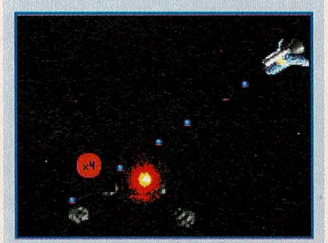
QuicKeys has to be installed on your hard disk using the provided Installer. The document you see during installation tells you what Extensions have been installed.

CD Index

Use this folder-by-folder guide to what's on the Cover CD this issue and just where you'll find it.

Arcade Games folder
Ambrosia SW
- Apeiron 1.0.1
- Avara 1.0.0
- Barrack 1.0.3
- Bubble Trouble 1.0.0
- Chiral 1.0.4
- Escape Velocity 1.0.3
- Maelstrom 1.4.2
- Swoop 1.0.0

Arashi 1.1.1
Bert 1.1
Delirium 1.1
Desk Invaders II
Frog Xing
Macman
Patriot Command



Arcade action in *Maelstrom 1.4.2.*

Demos folder
Abuse Demo
ClarisWorks Trial 4.0
DK Multimedia
- Castle Explorer
- The Way Things Work 2

Future Splash Animator
Gomark Ltd
- CameraMan
- Elastic Reality™ 1.2
- Electric Image
- Specular Infini-D™ 3.5
- Specular LogoMotion™ 2.0.1

Grolier Demos
- Circus
- 20th Century Art
- World Cup

JFAX Internet fax service
PowerBook 1400 Demo
Pro Pinball Competition
QuicKeys Demo
Red Valve It Demo
3D Ultra Pinball
3D World 2.0
WarCraft I Demo
WarCraft II Demo
Worms Demo

Desktop Video folder
Classic CD
Four Palms Digital
jaan@tp.estnet.ee
Media 100 animation
Movie Shareware
Mr Bouncyhead
PowerVideo
QuickCam Images
QuickTime 2.5

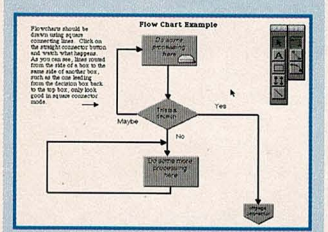
CD Index (continued)

MacFormat 45 Floppy
Give your Mac the OS 8 look with *Aaron 1.5.1*, relive your gaming past with *Bert 1.1* or start editing your own movies with the superb *QuickEditor 3.6*. All this *plus* loads of handy utilities.

Readers' Corner folder
The best contributions from talented MACFORMAT readers.

Resources folder
A folder crammed full of resources to help you make the most of your Mac, including *GraphicConverter 2.4.3*, *Disinfectant* and *QuickTime 2.5*, essential for our Video Editing feature.

Shareware Central folder
All the programs from this issue's shareware reviews. See page 107.
AllDay 5.0
BibleBrowser
Designer Draw 5.0
Droids 1.0
Insult Generator
MacDim 1.0
MiniCalendar 1.0
Phonebook Plus 3.5.1
Power Windows 1.2.1
QPict 2.1.1
RAM Charger 3.01
SimpleDate 1.4
Space Debris 1.4
Star Chaos



Flow charts made simple with the shareware *Designer Draw 5.0*.

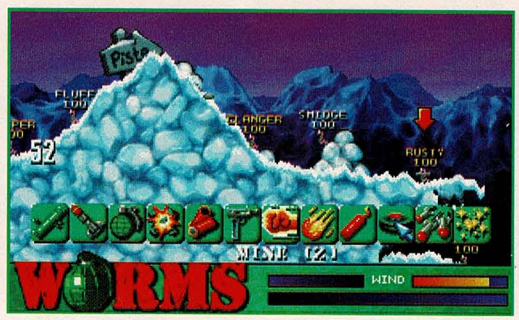
Shareware Plus folder
The best shareware collection around, hot from the Internet.
Applications
Comms
Developers
Education
Extensions
Games
Graphics
HyperCard
Icons
Sound
Updaters
Utilities

Tutorials folder
All the software and data files you need to accompany our FileMaker Pro tutorial, starting on page 50.

The Arcade

With luck, you will have noticed that MACFORMAT's third edition of MACGAMER is free with this issue. It's that special time again when the whole mag team can sit playing games when the boss walks through the office, without guiltily switching to *Excel*. You can join in too, with some excellent games on the CD. Not only do we have superb demos of *Worms* and *WarCraft I and II*, as well as the usual shareware games collection, but we also have a special arcade selection, designed to enable you to relive those magnificent gaming moments of old.

Worms



If you've always wanted to command a crack troop of super aggressive worms, then you're just plain weird.

What is it? Playable demo
Where you'll find it: Demos folder
Mac: 68020
PowerMac: any
Requires: 1.8Mb disk space

Remember *Lemmings?* It was an incredibly addictive game with a unique gameplay idea. We liked it so much that it was our Cover Disk demo on the first issue of MACFORMAT, back in the days of double density floppy disks! Finally, a company by the name of Team 17 has taken the concept and improved on it.

Two teams of four "Rambo"-style worms inhabit a changing landscape. Only this world isn't big enough for the both of them. The idea is to take it in turns to kill, maim and destroy your opponent's worms – and it's great fun!

You start by installing the game on your hard disk, then double-clicking on the application. Use the left and right arrow keys to move, the up and down arrow keys to aim your bazooka, and the **[space bar]** to fire. The longer you hold the latter down, the more powerful the shot. To change the weapons, press the **[command]** key once or twice.

For details of all the weapons, you'll have to see the **Read Me** file on the CD. There's three levels here to enjoy, but for a full review, turn to page 102.

It's tough being a worm, so be careful out there!

Uh-oh, scary things with wings! Dare you try *Worms?*

To Install

Run the Installer from the CD, which will install the game on your hard disk.

WarCraft II

What? Playable demo
Where? Demos folder
Mac? LC475 or better
PowerMac? Any
Requires? 7Mb free RAM, colour monitor

There's nothing wrong with taking someone else's game idea as long as you improve on it and make it your own, as seen with *Worms*. If you played the hugely successful games *Populous* and particularly *Warmonger*, you will recognise the basic gameplay elements behind our excellent *WarCraft* demos.

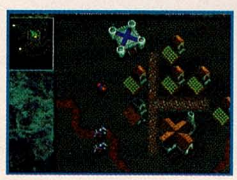
To get started, double-click the game, then select **Single Player Mode.** Click on **New Campaign** and choose whether you want to play as Humans or Orcs. Orcs are stronger, but also stupid.

You start with a few warriors and workers. The warriors can only attack and defend things, so you won't need them much yet. The workers can build farms, lumber mills and barracks. But first you'll need gold and timber.

Click on a **worker** and control icons will appear at the lower left of the screen. Click one of these icons, for instance **mine,** then click on the thing you want them to mine. Can't see a gold mine yet? Better do some exploring then.

On later levels you will need battleships. To build them you need oil from oil platforms. To build platforms you'll need oil tugs, and they in turn can only be built once you have a ship yard. To build a yard, you'll need a lumber mill, and you'll only manage that after you create enough timber and gold. You get the idea? Now build your community from the ground up. For a full review, turn to page 100.

Establish your community from basics in *WarCraft II.*



We have demos of both the versions of *WarCraft* for you to compare and contrast. Be prepared to use both sides of the sword if necessary!

To Install

Drag the entire *WarCraft II* folder to your hard disk for best results.

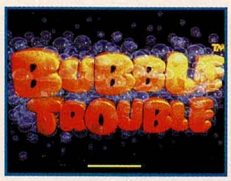
Bubble Trouble

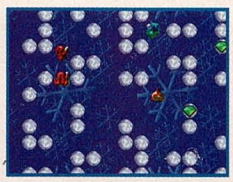
What is it? Shareware game
Where you'll find it: Arcade Games folder
Mac: LCII or better
PowerMac: Any
Requires: 3Mb of free RAM, colour monitor

Like many of Ambrosia's previous games, *Bubble Trouble* uses an old idea, and brings it bang up-to-date. You control a goldfish who swims around a grid of bubbles. Pushing a bubble causes it to move in that direction until it hits another bubble or the edge of the screen. If it's already resting against another object, pushing a bubble will burst it.

The catch is that you're not alone in your pond. Various other water creatures need only touch you to take a "life". However, hitting them with a bubble will cause them to die in a shower of bonus points. To achieve the *really* big scores, you'll need to push the diamonds around until they collide.

The default controls are the arrow keys and the **[space bar]**, but you can change these by clicking **Prefs** on the intro screen. Hint: the enemy is particularly vulnerable at the start of the game!





Manoeuvre your intrepid goldfish around the *BubbleTrouble* maze to earn points – but watch out for the the other life-snatching inhabitants!

Classic arcade gameplay takes seconds to learn, but will infuriate for hours as you keep getting killed on level two.

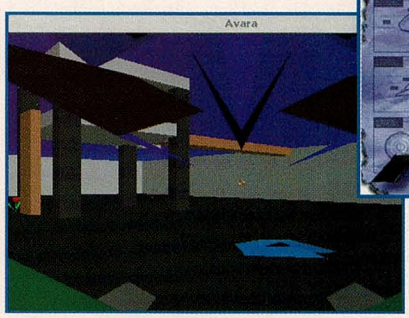
To Install

For best performance copy the entire folder to your hard disk.

Avara

What is it? Shareware game
Where you'll find it: Arcade Games/ Ambrosia SW folder
Mac: LCIII or better
PowerMac: any
Requires: 4Mb of free RAM, 10Mb of hard drive, colour monitor

If *Bubble Trouble* is too shallow for your tastes, then here's an ocean of a game for you. You control a walking robot gun-tower, similar to the ones seen in the *Star Wars* films.



Futuristic action awaits in *Avara*. Stride around the world in a giant robot shooting anything that's smaller than you.

Your environment is a 3D polygon world, drawn in real time – this means that although everything appears a little blocky, the action is all very smooth. The object of the game is to complete each level by making it to a transporter. You do have on-board weapons, but using brains rather than brawn will definitely get you further.

You can play solo levels against the computer, or play network games with connected Macs – and if you do manage to win through on every level, you can design your own levels. Ambrosia is setting up a special Internet Web site at **http ://www.avara.com/**, where you can find and swap more user-created levels.

There are lots of controls to be learnt – so your first task is to read the User Guide. It's worth it, because although it's shareware, this game is equal in complexity to many commercial games.

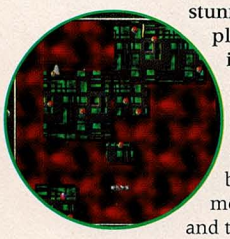
To Install

To get the best turn of speed, drag the entire folder to your hard disk.

Barrack

What is it? Shareware game
Wheret: Arcade Games folder
Mac: LCIII or better
PowerMac: any
Requires: 3.8Mb of free RAM, colour monitor

Barrack stands out from the crowd of shareware games because of its fabulously original and addictive gameplay. Although it's stunningly simple to play, the concept is bizarre.



You start in an empty playing field with a few bouncing balls. The mouse moves your laser, and the **[space bar]** rotates it from the horizontal to the vertical and back.

You can use the mouse button to fire the laser, but the idea is not to hit the balls. Instead, fire the laser so that the beam touches both sides of the screen. This creates a wall.

Then simply keep sectioning off the screen. Any section that doesn't contain a ball will be filled in – and you win when you fill 80% of the screen. On later levels you'll find unstable balls which explode when trapped in very small spaces.

Section off parts of the screen to win – get 80% and you've beaten the Mac.

To Install

You'll get the best performance by copying the game to your HD.

Got a problem?

Before installing software from the Cover CD or Floppy Disk, we recommend you always back up any important work on your hard disk. This precaution will avoid problems if it turns out that a program isn't compatible with your Mac set-up.

We make every effort to check our Cover Disks for compatibility and viruses, but the information here is intended as a guide only, and MACFORMAT cannot be held responsible for any damage to data, any inability to use this software or any resulting losses.

So please back up first.

If your CD-ROM or disk is defective, return it to us and we will replace it. Please make sure you have followed the installation procedures described in these pages correctly, to ensure that there is a physical problem with the disk itself. Otherwise, the replacement will give you exactly the same problem!

Enclose a self-addressed padded envelope (but we'll pay return postage) with the disk or CD, and a description of the fault. Please do not return disks or CDs to the editorial office; we don't hold any stocks of them and can only refer you to the appropriate address below.

Return faulty CD-ROMs to:
MACFORMAT CD returns
Andy Pope, Ablex Harcourt
Halesfield 14
Telford, Shropshire TF7 4QR

Return faulty HD disks to:
TIB plc, TIB House
11 Edward Street
Bradford, BD4 7BH

On the Floppy

QuickEditor

What is it? QuickTime editing utility
Where you'll find it: Floppy folder
Mac: LCII or better
PowerMac: any
Requires: QuickTime, 4Mb free RAM recommended

If you've ever seen the commercial video editors such as *VideoShop* or *Premiere*, you may notice how similar *QuickEditor* looks. That's because it is very similar, and includes most of the useful features. The difference is that while the alternatives cost in excess of £100 each, this shareware alternative costs only $20.

QuickEditor enables you to compose new QuickTime movies, or alter existing movies that you may have. You can chop bits out, rearrange them, add a stereo soundtrack or apply special effects. You can also use transitions to fade between one scene and another, using provided plug-ins. There's even a plug-in editor, so you can create your own custom plug-ins.

To Install

You'll need to drag the entire folder to your hard disk. To get started, see our guide on page 42.

QuickEditor is all you need to become a director and create your very own QuickTime movies.

Aaron 1.5.1

What is it? Shareware utility
Where you'll find it: Floppy folder
Mac: LC or better
PowerMac: any
Requires: any Mac

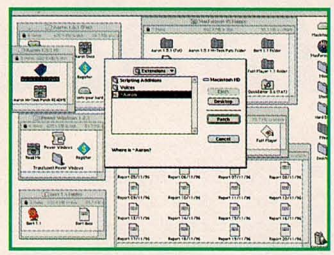
Now that Apple's plans for System 8 have changed once more, this Extension is probably the closest you're going to get to it until at least next July. Once installed, it will change the whole look of your Mac. Folders and windows gain a 3D look and even your Wastebasket gets a face-lift.

All the changes are cosmetic except for two window features. You can now resize a window by dragging any edge (just like Windows 95), and a button next to the zoom box collapses the window like **WindowShade** does.

For the real hackers we've also included *Hi-Tech Patch*. Use this on your *Aaron* Extension and it further changes your folders to give them a cool black look.

To Install

Drag the *Aaron* Extension and the Espi Sans font onto your **System** folder. You should receive a message telling you they will be placed in the appropriate folders. You may already have the font. Now **Restart**.



It's an acquired taste but *Aaron* can radically change your Mac, giving it that "I've already got System 8" look.

Bert

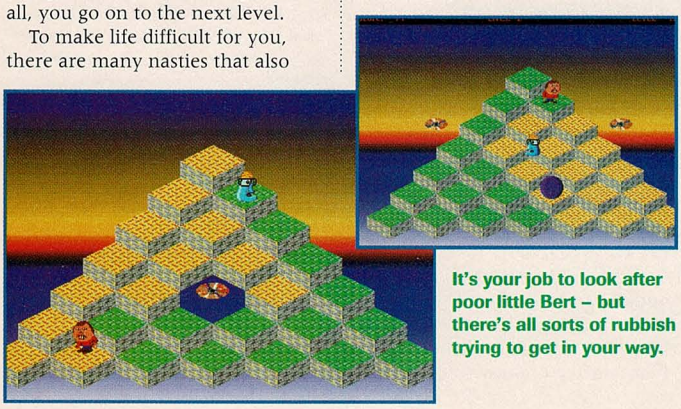
What is it? Shareware game
Where you'll find it: Floppy folder
Requires: any Mac

Bert is a modern version of the classic *Q-Bert* game that you might remember playing on a 32K BBC computer. The idea is to hop from block to block changing the colour of each one as you go. Once you've changed them all, you go on to the next level.

To make life difficult for you, there are many nasties that also hop around the board – so don't touch them. It's also a very bad idea to accidentally jump off into space, although you can jump onto the floating disks which act as lifts.

To Install

Drag the game onto your hard disk. You can set the control keys to whatever you like.



It's your job to look after poor little Bert – but there's all sorts of rubbish trying to get in your way.

Power Windows 1.2.1

Whatis it? Shareware utility
Where you'll find it: Floppy folder
Requires: Any Mac

If you are into customising your Mac, then you might just want to try out this wonderful little Extension. Normally when you drag a window, you just see its outline. With this installed, you'll still be able to see the contents of a window as you're dragging it. Okay, so it's not going change the world, but remember, Apple went to a lot of trouble to introduce transparent icon dragging in System 7.5.3!

To Install

Drag the *Power Windows* Extension onto your **System** folder. You should receive a message telling you it's now placed in the Extensions folders. Now **Restart** and try out the changes.

How to use your disk

High density floppy disks normally contain up to 1.4Mb of software, but so that we can bring you as many useful programs as possible, we use a compression utility to fit more on. This means you need to decompress the software before using our Disk; this issue you'll need 3.2Mb of hard disk space.

We also recommend that you always make a back-up of the MACFORMAT Cover Disk, just in case anything goes wrong.

To decompress the Cover Disk contents, open the MacFormat 45 folder on your hard disk and double-click on the MacFormat 45 icon. You'll see a screen telling you about the compression utility we've used. Click Continue when you're ready.

A box then asks you where you want to save the software. Choose the place on your hard disk where you want everything stored, and click Save to get hold of this issue's programs.

Capture and Create with Casio's QV-10A Digital Camera for only £349.99* (ex.VAT)

Shoot ▶ **Review** ▶ **Edit** ▶ **View**

Open up your computer's imaging potential with the brilliant Casio QV-10A Digital Camera. Probably the most exciting development in computers since the floppy disk, the digital camera allows you to input any image you want directly into your computer for inclusion in unlimited types of applications.

With it's built-in LCD screen the Casio QV-10A is easily the most versatile and easy-to-use digital camera on the market. You can see the image on screen before shooting, review any of the 96 images instantly and even delete those you don't need to free up memory. It's just one reason why the QV-10A has already proven to be so popular amongst computer users and why The Mac magazine awarded it 'Editors Choice' and Computer Life a 5 star 'BUY IT'.

QG-100 prints direct from the QV-10A

At work or at home the QV-10A makes producing more impactful presentations so easy. Include images in your letters, reports, leaflets and club newsletters. Build your own photo album or visual database, even add images to faxes and e-mail or illustrate your internet pages. Images can be saved as Bitmap, PICT's, TIFF's or in Casio's own CAM format and imported into virtually any graphics, word processing or presentation package and even into an Excel spreadsheet. You can also plug the QV-10A into a TV to display images making it the perfect presentation tool.

Link the QV-10A directly to the new QG-100 Printer and you can produce quality, adhesive mini colour prints without the need for a computer. The QG-100 costs just £199.99** (ex.VAT)

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Available from Action, Argos, Great Universal, Harrods, HCS Global, Inmac, Innovations, Jessops, Misco, Novatech, Powermark, RS Components, Selfridges, Silica, Software Warehouse, Tecno, Technomatic, Viking, Watford Electronics, Branches of The John Lewis Partnership, PC World and selected branches of Dixons and Boots plus all good photographic and computer stores.

FutureNet

http://www.futurenet.co.uk/

Your Web pages

Whether your Mac pursuit is serious or idle, Richard Hill's dug out the most essential Web destinations.

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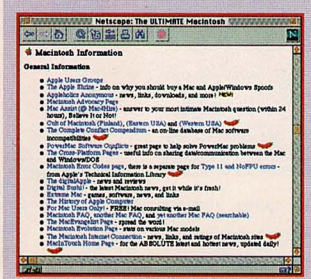
Ultimate Macintosh

The Ultimate Macintosh is the authoritative guide to Macintosh sites on the Internet. Compiled and edited by Michael Yee in the United States, the Ultimate Macintosh points you in the direction of every worthwhile Mac page, including official Apple sites, news sources, shareware sites for downloading software and Internet information.



The Ultimate Macintosh is one of FutureNet's most popular pages.

You'll also find pointers to areas concentrating on hardware, graphics, programming and more. A bumper guide to games joins a list of the major Mac hardware and software firms and their Web pages.

The Ultimate Macintosh is part of MACFORMAT ON-LINE, MACFORMAT's own Web site. Just point your Web browser at http://www.futurenet.co.uk/computing/macformat.html/

Desktop video

Your Mac uses a combination of different software items to record and play video clips, and it's easy to to use the Web both to find out about your different choices and to try them out. Apple's QuickTime is the standard format for holding the information used to make each frame of video, and you can always download the latest version from Apple's site. But there are many ways of adapting QuickTime for your own purposes. Using rival compression systems will make your video clip take up less room or appear sharper than usual, while keeping its old file size. Download the systems to use with your video-editing set-up. You can also download loads of sample clips from the Web (left).

Name	Web address
Horizons Technology	**http://www.horizons.com/**

The home for Power!Video, one of the new wave of video compression systems rising up as video moves from the high-cost professional arena towards being something everyone works with.

Iterated Systems	**http://www.iterated.com/**

The home for ClearVideo, another compression system designed especially for crisp Web video. Iterated produces other Web software, including an image compressor that uses fractal mathematics to work its magic.

QuickTime	**http://quicktime.apple.com/**

The official Apple destination for downloading QuickTime System software and sample clips, plus the latest news.

QuickTime Plug-In Sample Site	**http://www.mediacity.com/~erweb/**

Once you've got your QuickTime plug-ins installed into *Netscape,* come here to test-drive your set-up.

Radius Digital Video	**http://www.radius.com/Support/dv/maindv.html**

If you're preparing to roll your sleeves up for some serious digital video work, you may not find a better aide than this set of pages from the pre-eminent Mac video hardware firm. Lots of background detail and specific Radius support.

Terran Interactive	**http://www.terran-int.com/**

Movie Cleaner is yet another compression system for the sharpest possible video.

Games fans

The Net is full of of people talking about games, sharing their love of favourite games and exchanging ideas and tips. You'll find excellent pages written by genuine enthusiasts – not only on the latest cutting-edge titles for the Mac, but also mining gaming's diverse heritage on all sorts of computers and consoles. The Mac Gamer's Ledge (left), for example, has become an essential spot to visit – its regularly up dated news of game releases and gossip captures the up-to-the-minute excitement that Web pages should convey. You can find it at **http://www.macledge.com/**

Name	Web address
Ambrosia Software	**http://www.ambrosiaSW.com/**

Games fans turning their love into a business, Ambrosia specialises in games, recreating the charge you used to get from older, simpler titles. It's all sold using the shareware system and you'll find plenty of other treats here too.

Classic Atari 2600 Video Games	**http://www.uidaho.edu/~maas931/2600mac.html**

The spiritual ancestor to modern consoles like the PlayStation spawned dozens of fondly-remembered games. This site explains how you can play them on your Mac.

Classic Video Games Nexus	**http://iquest.com/~lkseitz/cvg_nexus.html**

If you want to find a specialist site on any aspect of arcade games, there's no better place to start than this list.

The Entertaining Macintosh	**http://www.princeton.edu/~pjcreath/macgames/**

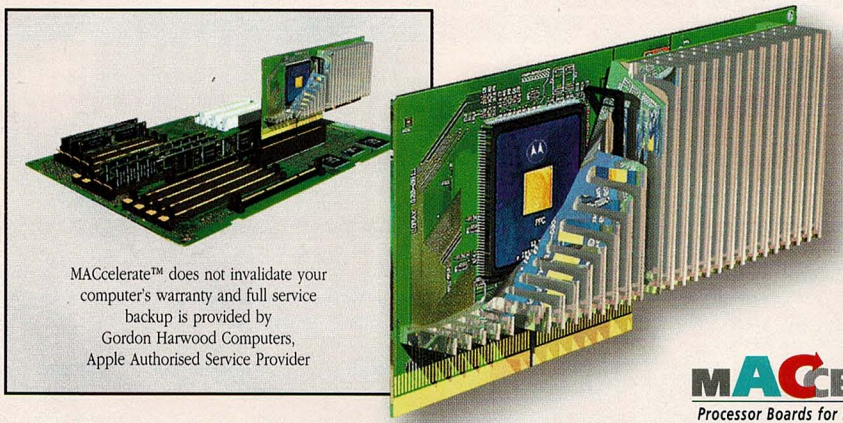
Information and links on a wide selection of Mac titles.

The Eugene Jarvis Fan Page	**http://www.cs.uregina.ca/~bakay/jarvis/jarvis.html**

Eugene is the very clever programmer behind arcade classics *Robotron* and *Defender.* Live the legend here.

In the time it takes to make one of these...

You can easily fit one of these...



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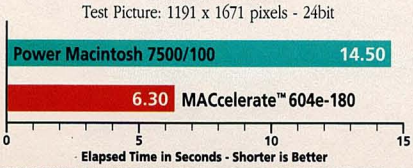

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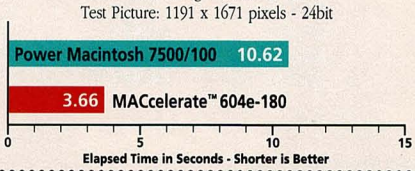

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NO CREDIT CARD SURCHARGES

Apple declares price war – but against whom? ■ Value machines from Apple and Umax ■ Changes for Mac OS in store ■ News Editor: Richard Hill.

MACFORMAT NEWS

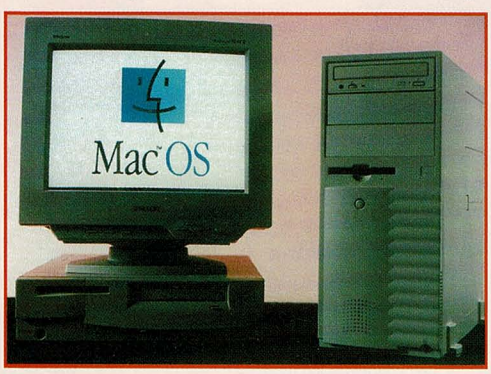
Cut-price Mac war

Apple has announced large price cuts for its current PowerMac range and a brand-new low-cost PowerMac, which you should find available for around £1,000. Makers of Mac-compatible computers, including Power Computing and Umax, look set to respond, offering Mac buyers the best choice they've ever enjoyed.

The moves from Apple are not an attempt to take on its Mac-compatible rivals, though. According to an Apple spokesman, Apple has changed the way it does business since the arrival of new boss Gil Amelio, demanding more competitive prices from the manufacturers it buys from and streamlining its own manufacturing process. Now these savings are being passed on to you. It means more people can afford to replace older Macs with a PowerMac, while new customers weighing up the choice of which computer to buy will see a compelling option in the Mac.

The new PowerMac 4400 is the most dramatic symbol of Apple's strategy: Apple estimates it should sell for between £950 and £1,050 when it goes on sale this month (you'll need to buy a monitor as well, though). Boasting the same 160MHz 603e processor as you'll find in the Family Macintosh and Home Office Performas, it's a no-frills Mac, without extra software, but including 16Mb of RAM, an eight-speed CD-ROM drive, a 1.2Gb hard drive and three PCI expansion slots for adding video or network cards, for example.

■ For more details, contact Apple on 0800 127753.



Umax's latest Mac-compatible is the Apus, offering both power and value.

The Umax Apus range

All models include 16Mb of RAM, an eight-speed CD-ROM drive and a 256K Level 2 cache. Monitors cost extra.

Model	PCI slots	Graphics card	Price
Apus 2000/120	2	No	£1,115
Apus 2000/166	2	No	£1,409
Apus 3000/200	3	Yes	£1,761
Apus 3000/240	3	Yes	£2,349

Umax value

It isn't only Apple that's adding fresh value to its line-up. Mac-compatible maker Umax's new Apus range includes a model priced at just £1,115. The Apus joins Umax's existing Pulsar professional range, but is more appropriate for users at home, in education or running a business.

The Apus 2000 offers a 603e processor with a choice of 120MHz or 166MHz speeds, housed in a desktop case. The Apus 3000, meanwhile, gives you the choice of a 603e chip at 200MHz or 240MHz, as well as with a graphics accelerator card for that extra turn of speed.

■ For more details, call IMC Computer on 01344 871344.

Apple's PowerMac range

Apple's range now includes the new PowerMac 4400 (right); monitors cost extra.

Model	Processor	Was	Now
4400/160	603e	–	£950-£1,050
8200/120	601	£1,949	£1,526
7600/132	604e	£2,725	£2,056
8500/180	604e	£3,829	£2,879
9500/200	604e	£4,212	£3,378
9500/180MP	2 x 604e	£4,841	£4,171

Radical change for Mac OS

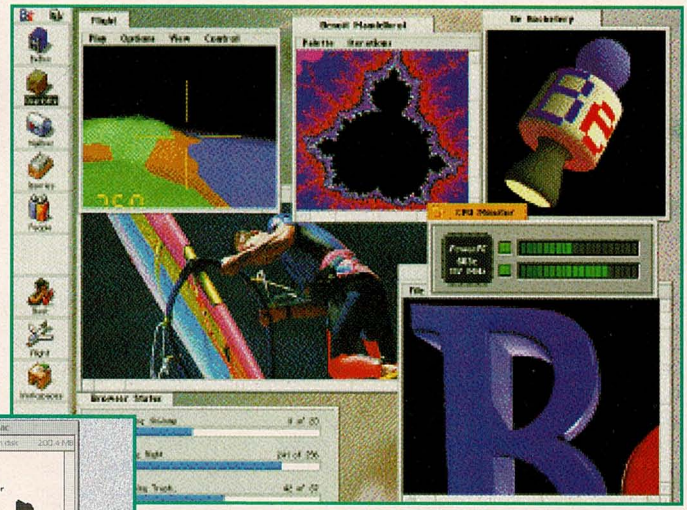
The direction of the Mac's operating system development seems set to change dramatically as Gil Amelio continues his shake-up at Apple. There are signs that Apple may abandon its current plans for Mac OS 8 and press ahead with a new high-tech system that will be way ahead of any rival – although it may not even be compatible with your current software at first.

Operating systems, such as the Mac OS and Microsoft Windows, affect how a computer works. The way a processor uses its time on different tasks; the way your computer screen appears; the ease of plugging in a new hardware device: all of this is managed by the OS. If an OS is powerful, easy to use and installed on many computers, publishers feel encouraged to develop software for it, and you enjoy a better choice of programs. This is the basis of the rivalry between OS creators like Apple and Microsoft.

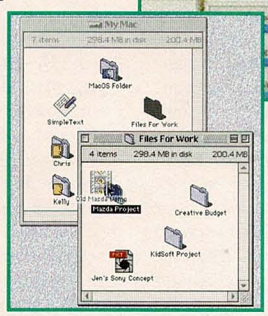
Mac OS 8, also known as Copland, has been trumpeted as the future of the Mac OS for several years, but its release date has constantly been pushed back. Copland technologies were to include the abilities to share your Mac's time between more than one program at once and to modify the appearance and functions of your Desktop to suit the tastes and abilities of different users. Apple announced recently (see our story in MACFORMAT 43) that many Copland ideas would in fact appear before the official release of Mac OS 8, with the first technologies appearing in a System 7 update scheduled for July 1997.

Now, though, Apple is pursuing a new direction. As we reported in MACFORMAT 42, a company called Be has created the BeOS, a new operating system with state-of-the-art abilities like multitasking and the ability to run any program written for it on a multiple-processor machine. Apple is negotiating with Be to buy the BeOS and a deal is close to being signed, according to a report in the US trade paper *MacWeek*. Apple intends, the report says, to merge the best of the Be OS with the best of Copland to create a new Mac OS 8 with capabilities far in excess of its earlier blueprint for the System.

Apple's chief Gil Amelio added fuel to the fire of speculation with recent comments at an electronics conference in California, where he discussed the need for a radical and progressive OS able to work on different types of computer – PCs as well as Macs. More significantly, Apple has removed long-standing information about the features you could expect from Mac OS 8 from its World Wide Web site (**http://macos.apple.com/**). The only official comment Apple will make is that it will unveil a new long-term OS plan in the next three months.



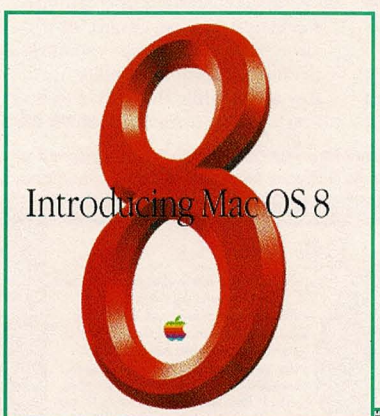
The system that's causing all the fuss: the BeOS is a state-of-the-art operating system. Has Apple got an eye on Be?



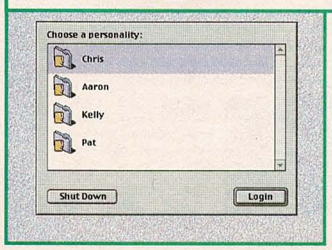
Look for features heralded for Copland appearing in a System 7 update soon.

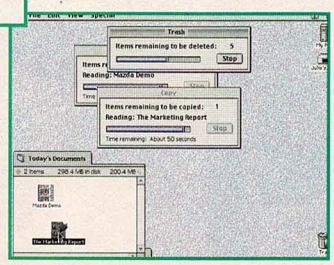
A merger of Copland's core program code and the BeOS could mean that a new OS for the PowerMac and PowerPC Platform arrives as soon as next summer, much sooner than the previous model of Mac OS 8. This time saving would be a vital advantage for Apple as other companies are hard at work on their own individual operating systems. And the BeOS is easy to rewrite for various types of computer: Be has already shown a version working on the PowerMac, and it could also run on Intel's popular Pentium chips, giving the new Mac OS an opportunity to sweep the market.

Any new OS would not be able to run System 7 based Mac programs, but Apple is said to be exploring an emulator program that could translate System 7 code into something the new OS could both understand and run. Apple has successfully used emulators before, prime examples being where older Mac programs have been run on PowerMacs and where Mac software has been run under the Unix OS, such as is used on large network and Internet computers.



After years developing Mac OS 8 – the planned successor to the current Mac OS – Apple is now silent about its future.





News in brief

Apple back in black

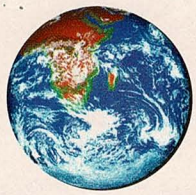
Confounding the expectations of financial analysts, Apple bounced back from recent heavy losses to register a $25 million profit between July and September. Apple claimed the quick switch-about was a result of the firm eliminating its backlog of unsold Macs and reducing costs. Despite an expensive Christmas season ahead, Apple feels confident enough to have scaled down already-announced job cut plans.

Mail order firms make Macs

Kicking off a new trend which promises to invigorate the Mac market, the two latest Mac OS licensees are focusing specifically on the needs of customers who order Macs through mail order. APS Technologies is a large US mail order firm which will be assembling own-brand Mac-compatible computers for its customers.

Upgrade card maker PowerTools, meanwhile, is planning the Infiniti, a range of Mac-compatibles it will sell direct to dealers. The Infiniti will be sold without RAM, hard drive or CD-ROM drive, enabling dealers to devise their own custom configurations based on their customers' specific demands.

Both these firms are looking initially at the American market, but UK firms may follow their lead. The West Midlands' Evesham Micros, for example, has thrived through introducing its own-brand line of PCs; now Mac dealers can do the same.



Multimedia collapse?

The CD-ROM publishing industry may soon shrink significantly, with major publishers forced to cut jobs or even to pull out of the field after experiencing higher production costs and poorer sales than they expected. The most prominent example of the collapse is the recent complete cessation of multimedia production at the First Information Group, which laid off over 80 people; and there have also been redundancies in CD-ROM production departments at Penguin, HarperCollins and Marshall Cavendish.

Production of leisure CD-ROMs has boomed in the last three years, with book publishers in particular viewing the silver discs as a rival to the printed word and opting to join the race for customers. After covering the predicted death of the book in the past few years, the national press saw the recent collapses as the book biting back. *The Independent on Sunday*, for example, asked: "Is the game over for the CD-ROM?"

Shrinking multimedia production reflects serious problems across the industry. Overproduction and a small marketplace are simply the beginning of the problem: technology, distribution, price and application have also been significant factors that have contributed to poor sales.

Dorling Kindersley is one of the dominant forces in today's multimedia market, with titles like *The Ultimate Human Body* and *The Way Things Work* (which has sold a million copies worldwide). It has set a standard of production that became a yardstick for the entire business, and many more titles are on the way. (We review the two latest releases, starting on page 94.) But DK's Tim Pilcher believes that only a very few firms can succeed at present. As he puts it: "Multimedia CD-ROM is a niche market and too many producers are jumping on the bandwagon."

And it's an expensive bandwagon. Although the basic technology for creating multimedia is probably sitting on your desk right now, a room full of PowerMacs is only a small part of the production bill, which can easily add up to £300,000 per title.

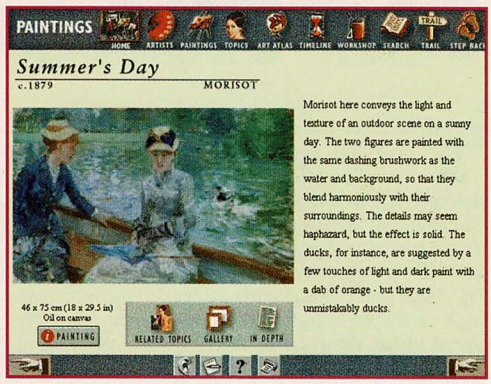
However, with a million-seller on the shelves for £30 or £40 a copy, the potential rewards are compelling. The City certainly thought so. The First Information Group, a company dedicated to CD-ROM production, benefited from shares trading at £1.65 in the spring. But titles like *The Unexplained* flopped, despite expensive production values that showed even DK the way forward. After losing millions, the men in suits pulled the plug and the share prices dropped to 15 pence.

Marshall Cavendish has a track record of selling lots of information, in the form of magazine partworks, with high production values at high prices – perfect for multimedia, you might think. And so it proved with its first foray into the market, which was a multimedia version of the part-work best-seller *Great Artists*. But even this success – it has sold about 40,000, according to Richard Leonard, Cavendish's head of Production and New Media – has not encouraged the firm to develop more titles. "The market is too small and the cost of producing the work in the current climate is too high," says Leonard.

The problem is more than simply one of oversupply. According to the European Leisure Software Publishers Association, 95 of the current 100 best-selling titles are games, even though games cost at least as much to buy as multimedia discs.

Some of the problems of the industry have been self-inflicted. The distribution and marketing of multimedia has been a disaster. Computer games stores, book sellers and record stores tend only to have small sections dedicated to multimedia CD-ROMs. But how many of them have screens for you to view the product? At up to £40 each, they are hardly an impulse buy, so people can't be blamed for wanting to see what they'll get.

Despite a boom time after the hype of recent years, the CD-ROM publishing industry faces unexpected growing pains as it strives to live up to customers' increasingly sophisticated expectations. At the same time, aspiring newcomers and established companies alike must stay afloat while they strive to find that winning formula. **SHANE ROE**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TOPICS
ART ATLAS
TIMELINE
WORKSHOP
SEARCH
TRAIL
STEP BACK
Summer's Day
c.1879
MORISOT
Morisot here conveys the light and texture of an outdoor scene on a sunny day. The two figures are painted with the same dashing brushwork as the water and background, so that they blend harmoniously with their surroundings. The details may seem haphazard, but the effect is solid. The ducks, for instance, are suggested by a few touches of light and dark paint with a dab of orange - but they are unmistakably ducks.
46 x 75 cm (18 x 29.5 in)
Oil on canvas
PAINTING
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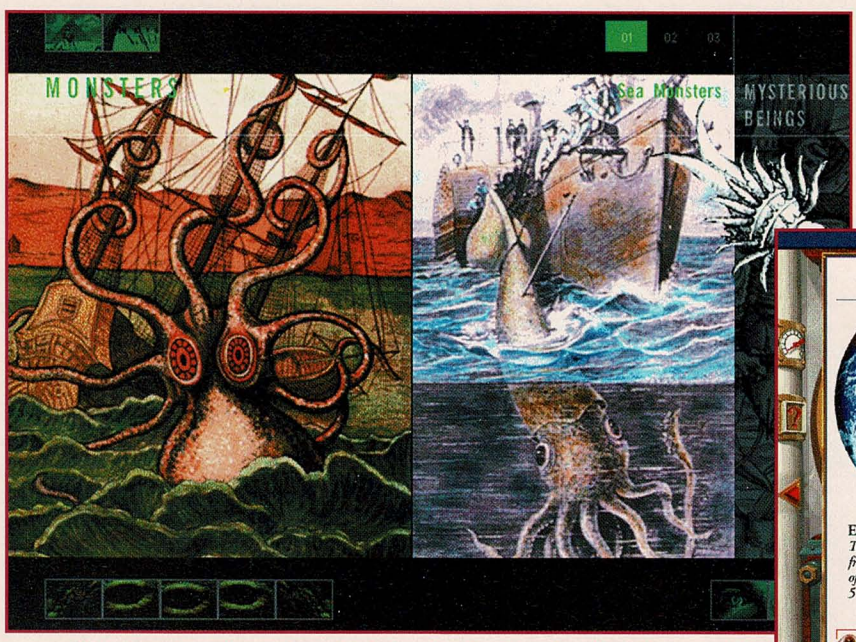
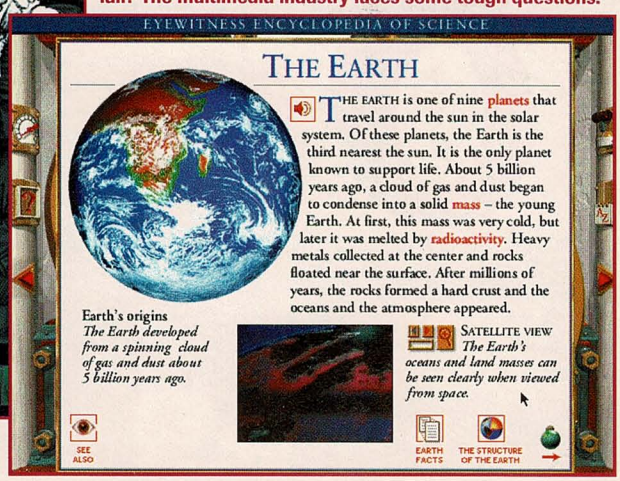
Magazine publisher Marshall Cavendish had a ready supply of material but couldn't make multimedia pay.

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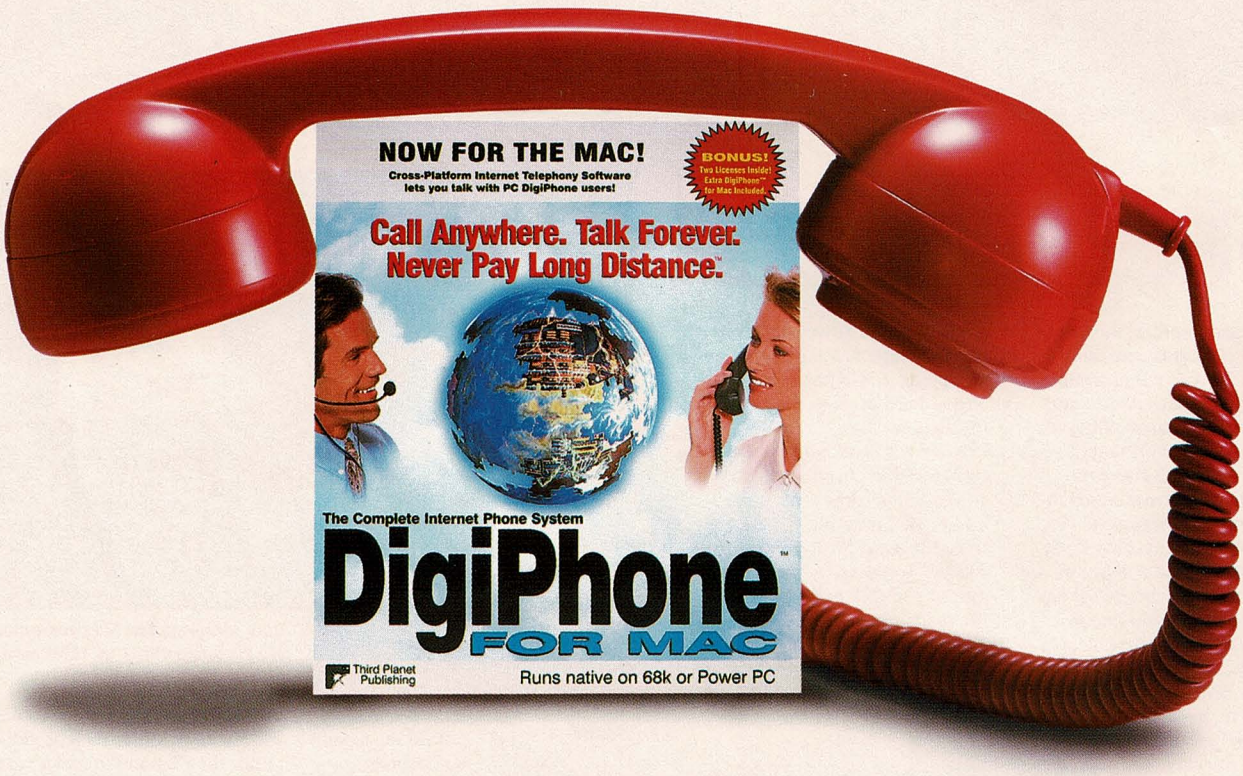
THE EARTH
THE EARTH is one of nine planets that travel around the sun in the solar system. Of these planets, the Earth is the third nearest the sun. It is the only planet known to support life. About 5 billion years ago, a cloud of gas and dust began to condense into a solid mass – the young Earth. At first, this mass was very cold, but later it was melted by radioactivity. Heavy metals collected at the center and rocks floated near the surface. After millions of years, the rocks formed a hard crust and the oceans and the atmosphere appeared.
Earth's origins
The Earth developed from a spinning cloud of gas and dust about 5 billion years ago.
SATELLITE VIEW
The Earth's oceans and land masses can be seen clearly when viewed from space.
SEE ALSO
EARTH FACTS
THE STRUCTURE OF THE EARTH

With strong branding and excellent discs like the *Encyclopedia of Space and the Universe* (right), Dorling Kindersley is one of the success stories of multimedia.

Are even good titles like *The Unexplained* (left) doomed to fail? The multimedia industry faces some tough questions.

GLOBAL CALLS LOCAL RATES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Motorola joins the Mac club with its first Mac-compatible computers, and the professional's choice for 3D animation comes to the PowerMac.

StarMax

Motorola, the semiconductor company that formed (with Apple and IBM) the alliance responsible for developing the PowerPC series of processors used in PowerMacs, has announced its own series of Mac-compatible computers. The company has been making both PC and UNIX-based computers for a number of years, chiefly for use as corporate networking computers, but this is its first foray into the Mac market.

Up until now, Mac-compatible makers have been relatively small companies working closely with Apple. Motorola is the first true heavyweight to produce Mac clones and has the muscle to challenge Apple on its home ground.

The new StarMax range has four machines, all based on the same motherboard, which was co-developed by Apple and Motorola. The StarMax 3000 series comprises two machines based on the 603e chip (found in the current Apple Performas) running at 160MHz and 200MHz, and both will be available in either desktop or mini-tower cases. The StarMax 4000 computers are also available in either case, but are based on the more powerful 604e processor – again offered in 160MHz and 200MHz versions.

Desktop and mini-tower systems won't only differ in case design: desktop versions of both the 3000 and 4000 series will be offered with 16Mb of RAM, three PCI expansion slots and a 1.2Gb IDE hard disk, while the mini-tower units offer five PCI slots, 32Mb of RAM, and a whopping 2.5Gb hard disk – the largest hard drive to ship with any Mac-compatible.

Motorola is adopting these RAM configurations from a belief that 16Mb will become a standard for home machines, with 32Mb installed in most business machines. All four computers accept a maximum of 160Mb of RAM. None of the machines is being offered with a processor daughterboard for the later installation of faster processors, but Motorola says that this possibility has not been ruled out for future machines.

The StarMax puts the Mac at the heart of business, thanks to Motorola's industry reputation.

Because all the StarMax systems are constructed around the same motherboard, they share almost identical features. Some of these are inspired by the Mac, as you'd expect, but you would more usually find other components in PC-compatible computers. This hybrid approach is aimed to assist Motorola's main constituency – the business user. The combination of components will mean for instance that a large firm could use any type of monitor, with its new Motorola Mac clone, rather than having to make sure it has either the right format or an adaptor for each one.

Both Motorola StarMax computers are available either as 16Mb desktop or 32Mb mini-tower versions.

From the Mac the StarMax takes the internal IDE hard drive system, external SCSI connectors for extra hardware and an Apple Desktop Bus connector for a Mac mouse and keyboard. PC-standard components include a port for an SVGA monitor plus PC keyboard and mouse connectors. Motorola's five-year guarantee on its machines is also intended to make the StarMax a compelling choice when it goes on sale this month. **LINDSAY BRUCE**

■ **For more details, contact Motorola on 01628 763200.**

What you get for your money

Motorola StarMax prices

Machine	Processor	Clock speed	Desktop retail price	Mini-tower retail price
StarMax 3000/160	603e	160MHz	£1,527	£1,879
StarMax 3000/200	603e	200MHz	£1,938	£2,290
StarMax 4000/160	604e	160MHz	£2,525	£2,995
StarMax 4000/200	604e	200MHz	£3,113	£3,465

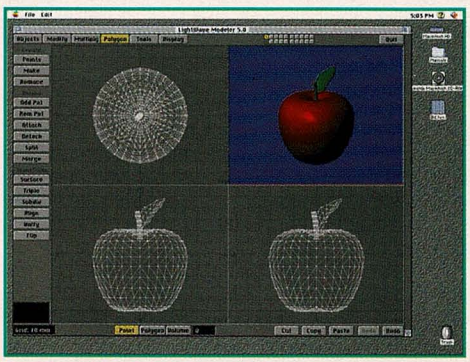
LightWave 5.0

As good as the Mac has traditionally been for creating professional 3D graphics, there has always been a level beyond the Mac's reach, where the demand for the best possible graphics has led companies and designers to high-price workstation computers like Silicon Graphics machines. But with the ongoing speed bumps of the PowerPC and the added value this gives the Mac, the walls of convention are crumbling; and it may be that the release of *LightWave 5.0* could start pulling the barrier down.

As part of the Video Toaster computer system, *LightWave* is a leader for 3D graphics – indeed you might have seen its convincing 3D models and extraordinary effects on TV programmes like *The X-Files*, *Star Trek: Voyager* and *The Chart Show*.

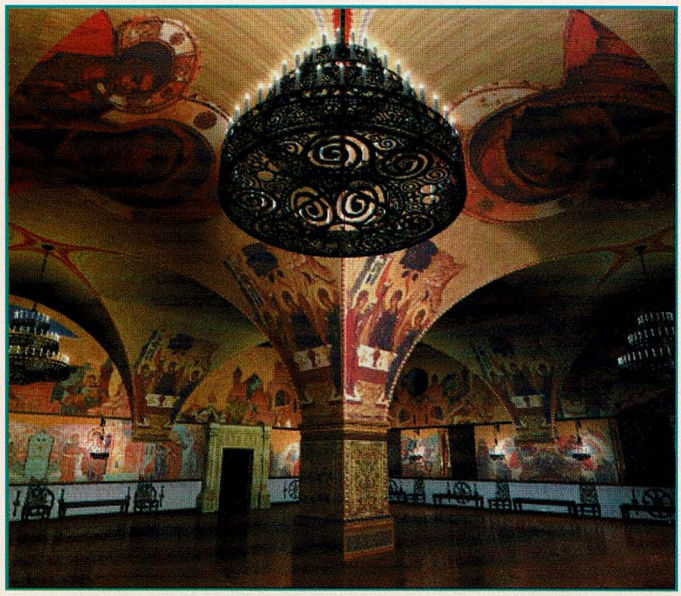
Now *LightWave* is coming to the PowerMac. It enables you to set up models in 3D environments, adding texture and lighting during the rendering process of building surfaces on your models. The modeller boasts an extensive range of tools for creating shapes and objects with ease and the included Meta suite is specially designed for working with organic forms.

You can use your model set-ups to create stunning still images, employing complex lighting effects like reflections, refraction through an object and diffusion. All these effects will also work within an animated sequence, where you'll be able to set up realistic motion and transformations with accurate physics settings. It will also be possible for you to switch camera angles at will, as well as modify the lens depth of field to produce your own convincing focus effects. **RICHARD HILL**

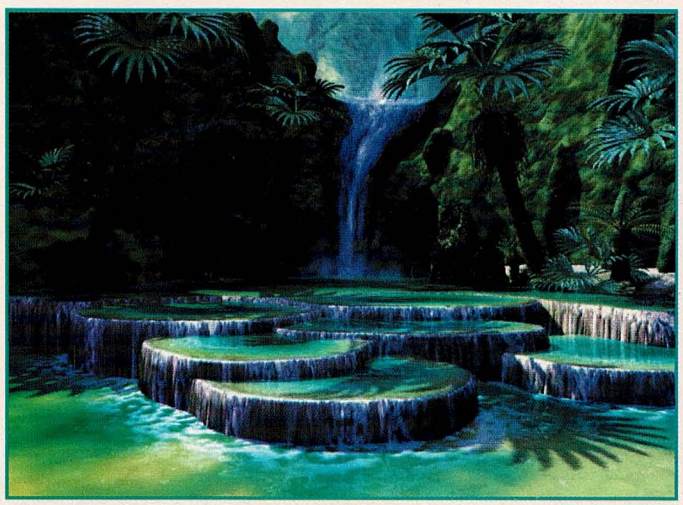


Acclaimed by the industry, *LightWave* comes to the PowerMac.

These robots were modelled in *LightWave* by Foundation Imaging.



***LightWave* enables you to build and light realistic environments, then bring them to life with the program's animation features. The scenes here were made by Frye Allen Advertising (above) and Westwood Studios (below).**



■ **Price: £1,169. Out: now. Contact: AMG FX on 0171 468 3452.**

PageMill 2

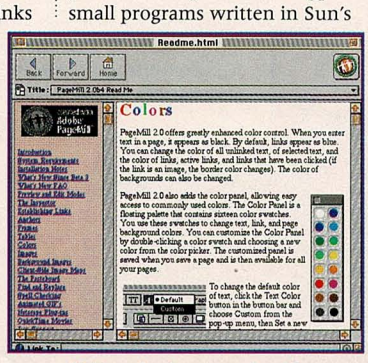
Adobe's release of *PageMill* early this year changed the face of do-it-yourself Web pages. It enabled relative beginners to build their own pages without having to learn the HTML instructions these pages are made from. Now that other companies are catching up on this initial breakthrough, can the imminent *PageMill 2* restore Adobe's lead?

The program's desktop-publishing-style approach and drag-and-drop abilities remain its foundation. You can see how your page will look as you create it, rather than having to interpret pieces of HTML code or load the page into a separate Web browser to check it. You can drag images from your image editing program straight onto a *PageMill* document; the application automatically converts the image format into one suitable for a Web page. You can also create links between your pages simply by dragging a symbol representing one page onto the block of text or image you want to become the link.

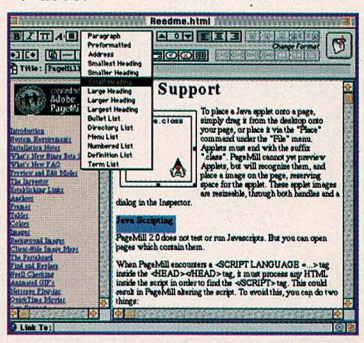
PageMill 2 adds features that enable you to design more sophisticated pages that you would normally have to use a more complex HTML editor to produce. You can use frames to produce pages composed of several panels, any of which a Web visitor can move around independently. You can also make a host frame which then provides links to all your site's major sections, while another frame displays the various pages as your visitor explores the site.

You can now also create sites full of animation and video, using Internet-standard formats like animated GIF and QuickTime. And you can incorporate Java applets – small programs written in Sun's fast-growing Java language – into your pages. In short, *PageMill 2* will provide all you need to start designing state-of-the-art multimedia Web pages. **RICHARD HILL**

■ **Price: £93. Out: now. Contact: Adobe on 0181 606 4000.**

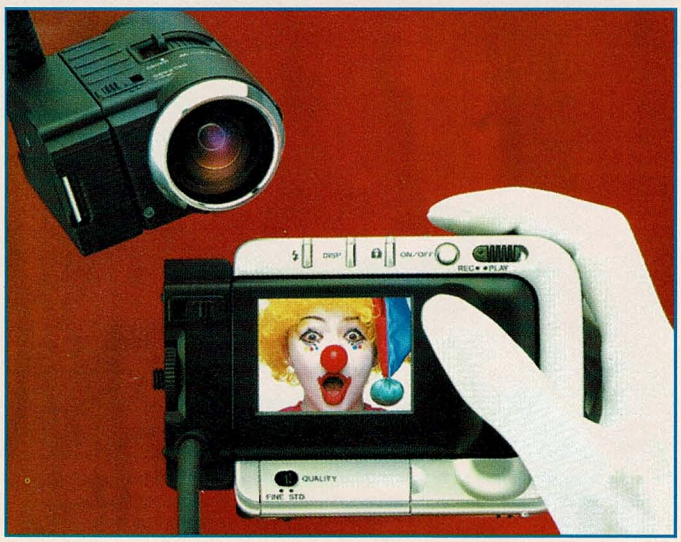


Taking the fear out of writing World Wide Web pages, *PageMill* is back with improved features.



You can pick text styles instantly, and design pages that use separate frames like the ones you can see here.

Digital cameras come of age



Photograph yourself with the Minolta Dimage's detachable lens.

Digital photography is becoming a more established part of the camera industry, with every major camera maker releasing models. The newest selection, shown at the Photokina show in Cologne, Germany, shows how the variety is spreading to offer devices for both home use and the most demanding professional photography.

Photokina is the world's largest photo show, an ideal venue to promote digital photography – using a camera that takes pictures in electronic format rather than producing an image on film. Going digital offers you many advantages: by connecting a camera to your Mac, you can quickly place images on your machine to use in DTP, paint packages or even Web page design.

Some people point to the high price and low picture quality of digital cameras compared to conventional models. But even so, digital cameras still make a lot of sense. Scanning pictures into electronic format costs at least £5 an image, while a good-quality desktop slide scanner costs around £1,500. As we discovered at Photokina, you can buy a good digital camera for well under £1,000.

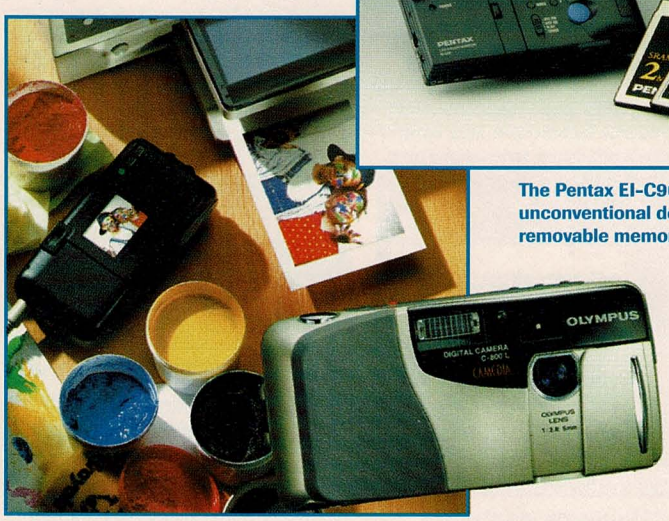
Minolta Dimage

Minolta's flagship digital model is the RD-175 – an impressive piece of kit, but at around £8,000 it's probably out of your financial reach if you just want to use it at home. However, the new Minolta pocket-sized camera the Dimage is ideal for everyday use. This innovative unit offers 640 x 480 resolution (equivalent to a 13-inch monitor), and a liquid crystal display (LCD) screen on the camera's back, so you can see images as you take them.

The lens is on a separate module that you can detach from the camera and use to take pictures round corners and in awkward places. The Minolta Dimage will be available in spring 1997 for around £800. **Contact Minolta on 01908 200400 for more details.**

Polaroid's first digital camera offers the quality of more expensive models.

The Pentax EI-C90 has an unconventional design and removable memory cards.



Looking reassuringly like an everyday camera, the Olympus Camedia is anything but, with digital resolutions of up to 1,024 by 768 pixels.

Olympus

Olympus's offering at the show was the most like the traditional compact camera found on every High Street. The range of three Camedia cameras have the same basic design but different features. The D-800L has an impressive 1,024 x 768 resolution and an LCD screen on the back; the 400L has the LCD screen and a more modest 640 x 480 resolution, while the 400 offers the same resolution without the LCD screen. Prices are £849, £699 and £469 respectively.

There's also a £499 dye-sublimation printer you can connect directly to the camera to print images. **Contact Olympus on 0171 253 2772 for details.**

Pentax

Another major camera manufacturer takes a completely different approach from its rivals. Pentax's EI-C90 camera is smaller than many, with its own very distinctive look. It offers the same 640 x 480 resolution as most of the lower-priced digital cameras, but its LCD monitor is detachable, enabling you to use it separately as a pocket-sized picture viewer.

The camera also uses industry-standard memory cards rather than built-in memory, so there's no limit to the number of images it can store at once, unlike most other digital cameras. No firm price or release date have been set as yet, but you can expect to see it in shops early next year. **Contact Pentax on 01753 792792 for more information.**

Polaroid

Polaroid pioneered instant photography – mention the name and that's what you think of – but if you need your images digital, nothing is more instant than a camera that takes photos digitally in the first place. The Polaroid PDC-2000 could be the best-value digital camera available today. It offers the detail you'd expect from a professional digital camera at a price much nearer to the affordable end of the market. Starting at £2,000, the range is still rather expensive for individuals, but for companies and professionals, the Polaroids will pay for themselves pretty quickly.

Ranging between £2,000 and £3,000 in price, the three Polaroid cameras all offer the same impressive 1,600 x 1,200 resolution – the prices vary according to the model's storage capacity. The cameras also feature a SCSI-2 connector to enable you to transfer images from the camera to your computer much faster. **Contact Polaroid on 01582 632000 for more details.** **MARCUS DYSON**

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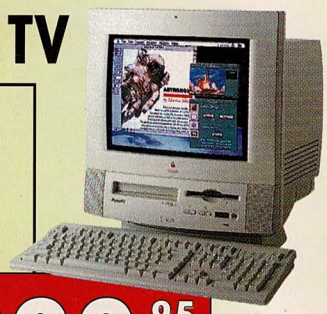

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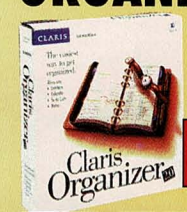

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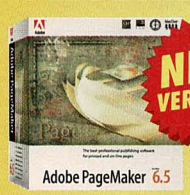

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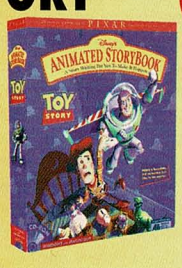

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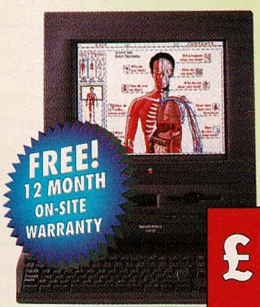

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How Jeff did it

I saw *Macintosh Da–* sorry, *Independence Day* and I left the cinema wondering how Jeff Goldblum infected the alien mother ship with his PowerBook, and just how convenient it was that these belligerent ETs had a Mac compatible system.

Then it hit me! In the film, the US Government have had an Alien Attacker ship that they recovered nearly 50 years ago. It would make sense that, as well as finding superior weapons and propulsion systems on board, they also discovered an advanced computer hardware/software technology that – within the film's internal logic and for reasons I cannot explain – formed the basis of the Mac and Mac OS!

If this were true, it would explain why the Mac and Mac OS are light years ahead of the poor human attempt to copy superior alien technology, the PC and Windows!

You want proof? An anagram of **Apple Macintosh** is **Alien Mac Shop PT** (PT obviously being some weird alien word of sorts).

Of course, it could be that the producers knew bog all about computers and just didn't think this one through at all, but I think we all know the real truth...

Remarkably yours
Jonathan Mock
via FutureNet

Yup. I think we do.

Where in the world?

Further to your periodic letters and comments about support for Mac products from the major outlets, I was in PC World in Edinburgh about a week ago getting paper and I wandered across to the small Apple section as is my wont and discovered that they didn't even have the usual *two* Apple computers. When I asked why, I was informed that they had sold the models they had and wouldn't have any more for at least two weeks.

Ian Bruce White
Edinburgh

So, er, it's all the suppliers' fault?

Nightmare world

I sympathise with Colin Head [who wrote to ask where he could buy Mac products in the High Street]. If he follows [Apple Marketing Manager] Stephen Doran's advice (MACFORMAT 40) and visits PC World in Guildford he will be sorely disappointed. I was there two days ago and found that they had in stock a few Dorling Kindersley CDs, three or four games, one copy of *ClarisWorks 4.0* and one copy of *RAM Doubler* (at £79.99!). They stock a very limited range of Macs and printers and the two members of staff I spoke to were clueless; they told me that "you can't get external CD-ROM drives for Macs – no-one makes them" and "you can only get Mac compatible modems from big Apple dealers". The staff are dispiritingly uninterested, the more so as soon as Macs are mentioned. They seem to find Macs and their users amusing oddities in a world where PCs rule (nightmare!).

If Apple can't tell us where we can really buy software in the High Street, perhaps MACFORMAT could compile a listing of outlets based on readers' recommendations.

Mark Perryman
via FutureNet

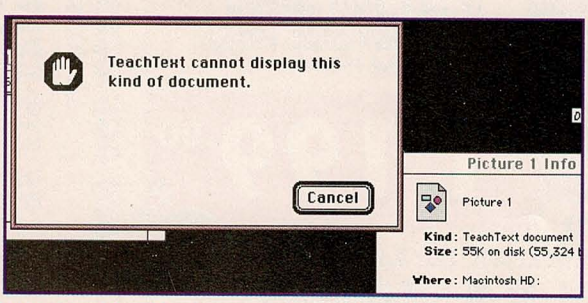
Apple does have an ongoing program aimed at getting Mac products into more High Street outlets. We'll keep you informed about what's planned – and perhaps you could give us feedback on how it's going?

Last week's model

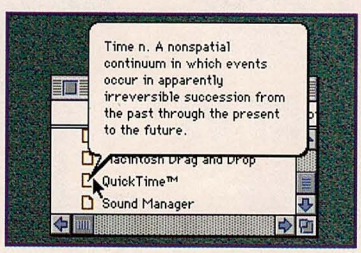
Some time ago I was given a Performa 600CD as a present. It is a really good computer, and does everything I need, but about a month after that I opened up my MACFORMAT and what did I see but a Performa 630 with added-in television (so you could watch your favourite programmes on your Mac). Then about a week after that, I saw a Performa 5200 with added TV and modem. It gets worse!

Why do the people at Apple upgrade everything so quickly that it's impossible to keep up? Why have a system where every three months or so they put more Macs on the market that are completely different? Or where they tell you what's coming out so you can decide whether or not to buy?

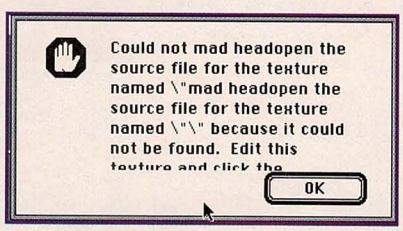
Also, why doesn't Apple advertise very much? Macs are surely too much of an excellent computer to be kept in the dark. I'm the only pupil in my whole school (950 pupils) that has a Mac, and it would be nice if they climbed up the desirability scale a bit – everybody reckons they are naff. This angers me incredibly as they almost



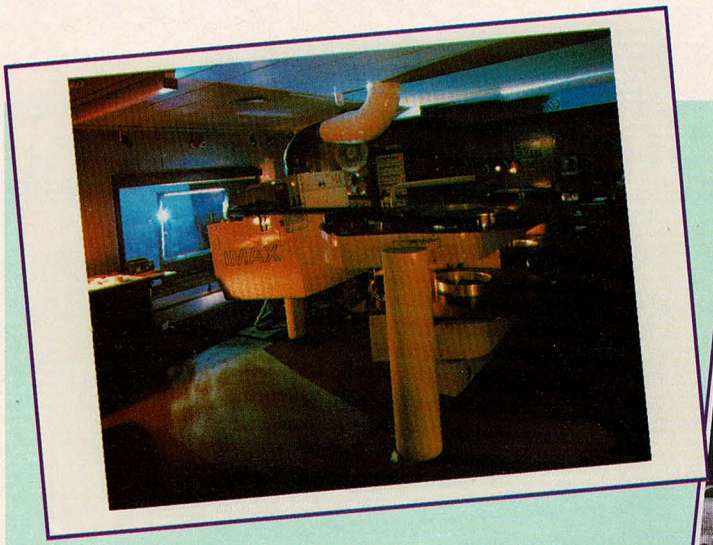
Silly Things Your Mac Says, number 455, from Mark Orrow-Whiting of Headington, Oxford. Unusual to find an application unable to recognise a file when Get Info has no trouble identifying it...

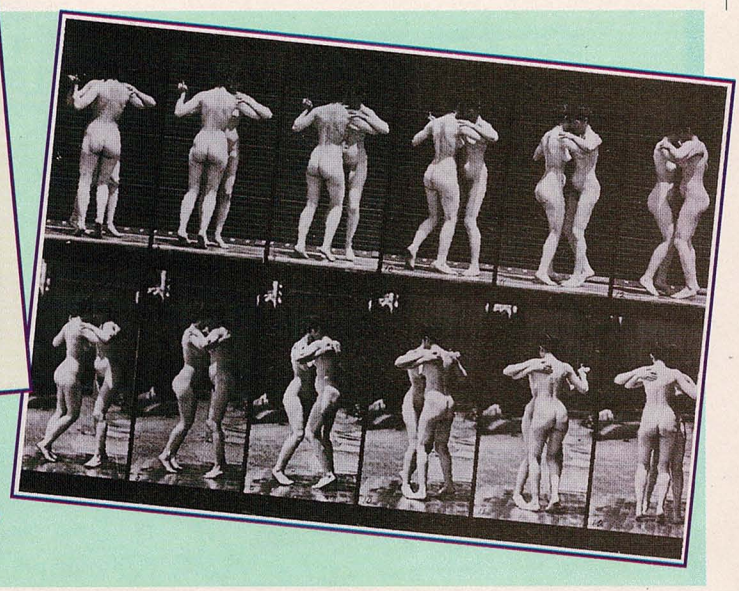

Time n. A nonspatial continuum in which events occur in apparently irreversible succession from the past through the present to the future.
Macintosh Drag and Drop
QuickTime™
Sound Manager

Martijn Sminia of Castricum in Holland got this simply by turning Balloon Help on. "As you can see," he says, "there is potential for Balloon Help, which must be a relief to the guys who wrote it."


Could not mad headopen the source file for the texture named \"mad headopen the source file for the texture named \"\" because it could not be found. Edit this
OK

Casey Dobie of London SE6 got this, his first weird error message in over eight years of Mac use, he says. He explains that he was trying to restart a suspended rendering in *Strata StudioPro*. There was a texture named "Mad Head" that it seemed unable to find...

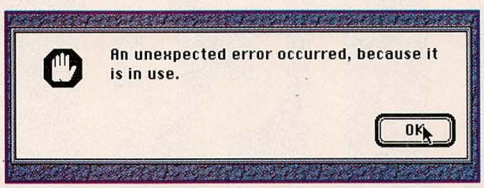




Two more MACFORMAT binder winners for our video issue: the IMAX huge-screen projector at the National Film and TV museum in Bradford, sent in by Liz Lorkin of Melston; and one of Eadweard Muybridge's motion studies, from Hamilton Ford of Teddington in Middlesex. Remember, whenever you write to MACFORMAT an eye-catching postcard could win *you* a binder!

certainly have never tried one, let alone heard of one.
Kyle Alexander (age 13)
Aldershot, Hants.

Okay, we'll come clean. Whatever Mac you've bought, after about three months there will be a faster version of it with more features. Within six months there will be a completely new model with lots of great stuff you don't have. In about a year there will be a new range with terrific features that ***nobody*** *has yet. That's true at any time, and of any product (especially when technology is developing as fast as Apple's is these days). So what? If you've got "a really good computer" and it really does everything you need, why worry? If you wanted a car, would you wait a year because you knew that next year's model will have more to offer? It's bound to, but how are you going to get around in the meantime?*



Proof that your Mac generates error messages by randomly combining phrases? A gem from Nick Wheat of Chesterfield. Has *your* Mac given you a silly message? Grab it by hitting [command] [shift] 3 and send it to us by mail or by e-mail to macformat@futurenet.co.uk with "Silly Things" in the subject line.

Anti-American bias?

Hello, MACFORMAT, from the USA! I don't know what the heck you guys are debating about being "anti-American" bias. For crying out loud, its a British magazine! They have the right to be patriotic to softwares made by Brits. Well, just speaking my mind. Later...
F Matute
Long Beach, California, USA
via FutureNet

A genuine reader comment. As if you ever doubted that.

Just curious

Hi! Congratulations on having a great magazine, and the best Cover CDs. My question is: how fast, in MHz, is the average human brain? Anyone know?
Thanks in advance,
Samantha Pinheiro
via FutureNet

I knew this obsession with megahertz was counter-productive. The question is meaningless. You might just as well ask how many miles per gallon a Mac gets. Me, I blame all those PC advertisers who had to invent a selling point...

The horror! The horror!

Mike Goldsmith was right on the ball with his 92% rating for the excellent *Logical Journey of the Zoombinis* game from Brøderbund (MACFORMAT 37). My children (aged 4 and 6) love it, even though they can only manage the simplest level of play (which is about all I can manage too). It is both challenging and entertaining, and as a primary school teacher I appreciate its educational value.

On the issue of the Sm*rfs, however, Mr Goldsmith was tragically mistaken. Far from having gone "the way of the hula hoop" as he suggested, the little fiends were, even as his words hit the newsstands, preparing to reinvade popular culture with their hideous squeaky voices and mindless songs. In fact, I hold Mr Goldsmith personally responsible for the return of the Sm*%@!rfs. Did he not appreciate that even mentioning them in print was inviting disaster?

The only way to ensure that the Sm#¶¥*!$£%rfs never rear their heads again is to remove every reference to them from every aspect of human culture, destroy all related products, and imprison those involved in their creation. The least that Mr Goldsmith could do is issue an apology.
Nicholas Tong
Cardiff, via FutureNet

Hey, you know what? I ***am*** *sorry we mentioned them...* **MF**

What would you like to see in System 8?

Apple's Chief Executive Officer Gil Amelio said in the MACFORMAT interview last issue that everybody now pretty much agrees on what should be in a good Operating System. So how about these smart new ideas for Mac OS 8?

■ **Trevor Hawkes** of the University of Warwick sent us this System 8 wish list:
1. The ability to select all files in a folder with a specified string in their names.
2. The ability to trash selected files in a single keystroke. ("There may already be a macro-building facility to do this, as in *QuicKeys,*" Trevor says, "but I haven't discovered it yet.")
3. A standard facility in all Mac applications to change the title of a folder by double-clicking on the title bar of an open window.

■ **Joris Witteman** of Haarlem in the Netherlands says he'd like to see:
1. Some control panel (or preferably an application) to handle and configure icon bundles yourself without having to damage your System suitcase with *ResEdit.*
2. An "Advanced..." button in the **Info** window that lets you configure the Type and Creator of any file. *[You can do this with a lovely little shareware utility called* ***Get More Info*** *– it wouldn't be the first bit of shareware to find its way into the System...]*
3. Some way to delete unrecognised Preferences files before restart (or at startup, by holding **[command] [option] X**).
4. A separate installer which installs the recommended limitation of System Extensions for more "economic" memory use.

■ Finally, some ideas from Carl Brown (age 15) of Amersham, Bucks.:
1. The ability to choose labels for documents when you save them, rather than have to find the document and change the label later.
2. A back-up feature available when saving documents, so that files would automatically be duplicated and stored in a special folder. "This folder could then be locked," Carl suggests, "and even if one copy of the document is accidentally thrown away, there is another for protection. Good, eh?"

What would you like in System 8? Send your "System 8 Wish List" to the address opposite.

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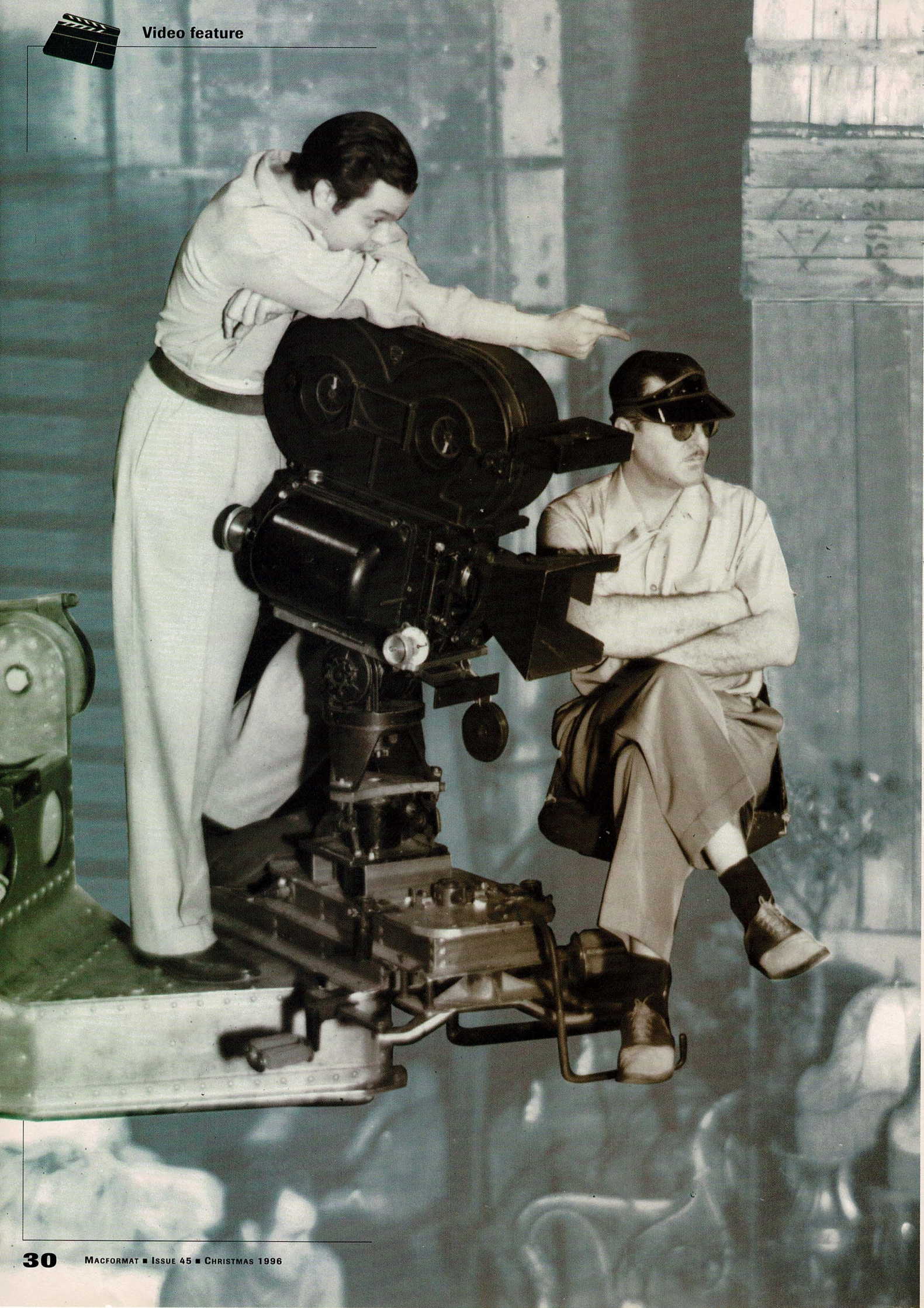


Desktop Video

Producing a movie used to take a studio-full of personnel and equipment. Now Macs are transforming the world of film and TV production – and can even bring video editing to *your* Desktop!

Not so long ago, DTP software on the Mac revolutionised publishing. Today, Mac-based desktop video editing is transforming the world of film-making and television production. Production companies are increasingly able to create their programmes on their own relatively affordable equipment, rather than relying on impossibly expensive "edit suites". And most exciting of all, the unparalleled power of even an entry-level Mac today puts this sort of capability well within the reach of any would-be Orson Welles.

It hasn't quite taken over the world yet, but it's rapidly becoming common, not just the novelty it was only a year or so ago. Back then, only a handful of "fast-turnaround" TV programmes like *Panorama* and *EastEnders* were edited digitally, on Mac-based systems from industry pioneer Avid Systems.

Today, the output quality possible is so high that even the notoriously quality-conscious Channel 4 has just broadcast its first documentary programme entirely edited on a Mac, using the newer Media 100 system – the production company responsible tells the inside story on page 38. It's now possible for an entire production – music and sound as well as video and effects – to be completely Mac-based, and you can see the results for yourself in a new BBC documentary series being shown next month. Digital music engineer Bob Dormon tells the whole story on page 34. You can even try digital video editing for yourself with the software and sample video clips on our Cover CD this issue – there's an easy-to-follow guide to getting started on your first project with *QuickEditor* on page 42.

The bad old days

So how does it all work? Well, to understand that, you have to start with video tape. When it was invented, way back in 1957 – not by Sony, Philips or JVC, as you might have expected, but by Ampex in the US – it ushered in a new era of smaller, more manoeuvrable cameras and cheaper, faster production: what you'd shot was ready for playback as soon as you'd finished and didn't need developing. There was just one big problem: what if you didn't quite like what you'd shot and wanted to edit it?

With film, you could actually see the pictures, cut the strip precisely between one frame and the next using nothing more complex than a pair of scissors, and then stick it all back together again in the order you wanted. Video tape, however, just looked like a metallic brown ribbon. In fact, in the early days, they did try splicing it the hard way: they coated the tape with a special disclosing liquid to make electronic markers called "synchronisation pulses" visible (at least under a microscope), and tried to cut the tape in the right places using razor blades. It was a nightmare.

On the line

No, the only practical way to edit video tape was to copy it. You had to make a note of the scenes you wanted, then copy them in the right order to a new tape. This was named "on-line" editing, because each time you did it you created another "generation" of your movie in a direct line of descent from the original. The disadvantage was that you could only do this a couple of times before you started to notice the picture quality deteriorating, even with broadcast quality gear, and after about the fifth or sixth generation you were talking dandruff in a snowstorm.

In the late '70s they came up with a better idea: "off-line" editing. This exploits the fact that a video camera doesn't just record pictures and sound but also lays down a "time code" which labels each individual frame with its own reference number. (You've probably seen music videos that try to add that techno-trendy look by displaying the numbers whizzing by.) Off-line editing works as follows. You make a copy of your master tape, then edit this copy by copying scenes as before on to a new tape in the right order, to produce a "first assembly" or "first cut". Inevitably this won't be quite right, so you can take your first cut and edit it again and again until you can barely make out what's on screen – but this doesn't matter, because all you need is to be happy that you've got the right scenes in the right order. When you are, you just record their time codes in what's called an "Edit Decision List" or EDL.

Then you simply take your original master tape along to a computer-controlled on-line editing facility, feed in your EDL, and the computer will "conform" your master tapes – that is, copy precisely the scenes you want from the master to a new tape according to the instructions in the EDL. Result: a tape with the right scenes in the right order, just one generation removed from the master so that deterioration is minimised.

This system, however, is still not ➤

ON THE CD

There's over 120Mb of editing and effects software, sample clips and more in the **Desktop Video** folder

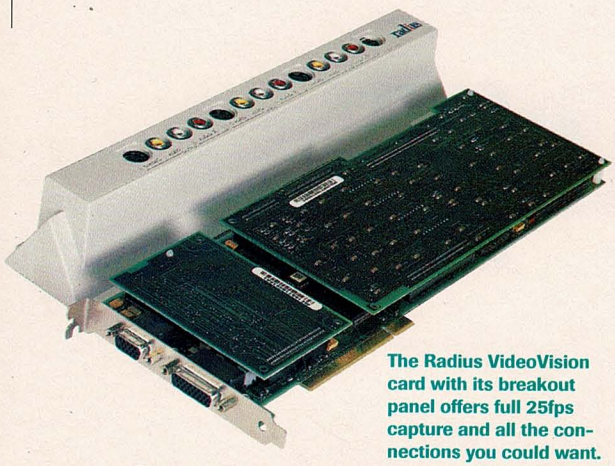
First shoot a film

Digital editing is all very well, but how do you get digital footage in your Mac in the first place? Well, most of the time you need a video capture card. But if you have an AV Mac (like a Centris 660AV or Quadra 840AV), you have video input and output capacity built-in, and the extras inside to make use of it.

The same is true if you have a newer Mac fitted with a TV Tuner and Video-In card – you can input an S-VHS or Composite signal from TV, VCR or camcorder and capture this to your hard disk at a reasonable 15 frames per second.

How about video capture without even a camcorder? The Connectix QuickCam is a tiny golf-ball-sized video camera that simply plugs into your serial port and costs under £200 (under £100 for the mono version). It's reviewed on page 70.

Even if you've got none of these, you can get hold of "clip movies" (not movie clips, but footage you can use like clip art). We've included some on the Cover CD from Four Palms Digital Video, a company in the US – see the Read Me file for contact details.



The Radius VideoVision card with its breakout panel offers full 25fps capture and all the connections you could want.

quite ideal – for a start, you're still having to work from pictures that get worse and worse the more you work on them. A better option would be a "non-linear" system – one which doesn't require you to make copies of copies at all. This finally arrived in late 1990 – and, naturally, it ran on a Macintosh.

The first step is to digitise all the scenes or clips (or "rushes") you'll want to use – the video equivalent of scanning in a graphic. The editing software can then display each clip on-screen, usually as a separate little icon in a special window often called a "bin" (though really it's more like a corkboard where you can pin up picture postcards). This enables you to put them in the right order just by rearranging the order of the icons – as easy as clicking and dragging.

Alternatively

For basic "assembly editing" – that is, getting scenes onto tape in the order you want – you don't have to digitise your footage; you can simply use your Mac to control your VCR and camcorder via *VideoDirector*. It doesn't need expensive video cards, extra memory or any hard disk space, and it costs just £85 or less. For more details call Gold Disk on 01753 832383.

Cut! And paste...

Not quite right? Move them around again. Want to shorten a scene? You can do that too, and lengthen it again, as many times as you want, with no loss of quality because you're not working on successive copies of a tape, just on digitised data held in your Mac's memory.

It's just like word processing, really. If you were writing a letter on a typewriter and wanted to add just one word to a paragraph you'd already typed, you'd have to type the whole page again and add it in – and then, if the text overflowed the page as a result, quite possibly retype every page *after* that as well. In the same way, if you were editing a movie on-line and wanted to add a two-second scene, you'd have to re-record the whole tape up to that point, add the two seconds, then re-record the rest of the tape again as well – a whole new generation, with the inevitable loss of quality, just for those two seconds.

With a tape-based off-line system the loss of quality is unimportant, but the whole process is still time-consuming. Yet with a word processor, you can not only add a word to your letter but cut-and-paste as you choose, because the whole thing is held in memory as digital data. Non-linear editing on the Mac brought exactly the same convenience and flexibility to video editing.

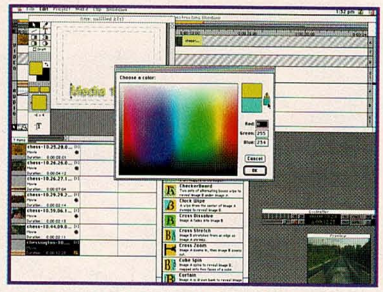
As you'd expect, this is transforming the world of film and television. Recent movies including Clint Eastwood's *The Bridges of Madison County*, Oliver Stone's *Nixon* and Mike Figgis's *Leaving Las Vegas* were edited using a top-of-the-range, "industrial-strength" digital non-linear system, *Film Composer* from Avid Technology – the company's Web site (**http://www.avid.com/**) lists more than 300 feature films that have been edited with the system!

Going private

For two years now the BBC has been using the television version, *Media Composer*, to edit *EastEnders*, as well as *Panorama* and other topical programmes that need to be put together quickly – and because the quality depends purely on the quality of the initial digitising, these programmes are regularly broadcast direct from Avid cuts, without going through the extra step of an on-line conform process, meaning that they can be edited right up to a few hours before going on air.

With the increasing "privatisation" of the production process, more and more independent film production companies are making the investment in only slightly more modest systems or using modular alternatives based on plug-in video cards which can put a video studio on the Desktop of just about any Mac.

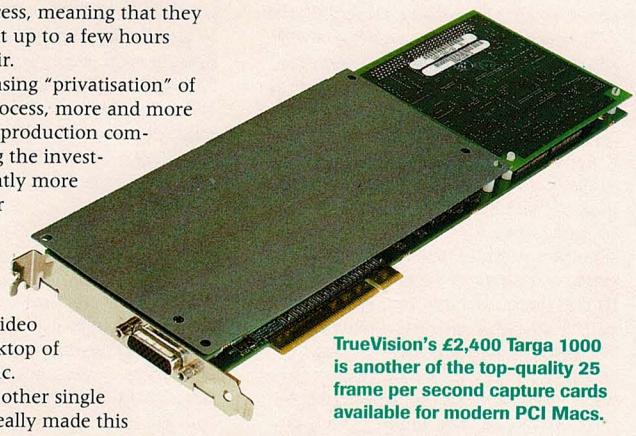
More than any other single factor, what has really made this trickle-down effect possible is the increasing power of Apple's QuickTime video player technology. It handles not only the display of video, but also includes compression routines which make it possible to fit all that video data onto a hard disk (see the "Make room" box opposite). Many of the editing systems – including Media 100's new mid-range offering, Media 100 QX – are based on QuickTime, as is the industry-standard software, *Adobe Premiere*.



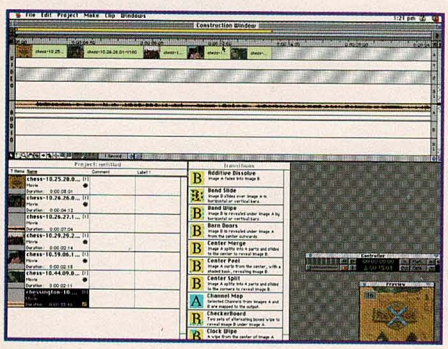
***Premiere* rivals its stablemate *Photoshop* in the level of control that it offers over even the small details, like text colour.**

Soft but quite hard

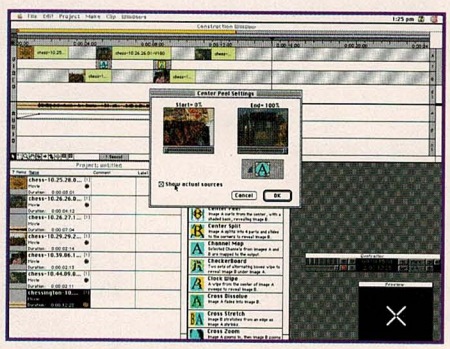
Premiere is to video what *Photoshop* is to still graphics. It features a powerful array of icon-controlled tools for cut-and-paste editing, adding transitions, trimming and adding effects – it even supports *Photoshop* plug-ins. It isn't exactly simple to get started with, though, as the screen-shots on these pages show: it uses up to six floating windows – a project window and



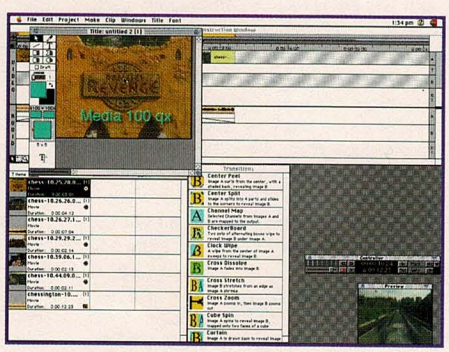
TrueVision's £2,400 Targa 1000 is another of the top-quality 25 frame per second capture cards available for modern PCI Macs.



***Adobe Premiere* in action, using a Media 100 QX system. The range of windows you must juggle can make it a bit of a squeeze on a smaller monitor.**



You take your clips from the "bin" at the left and arrange them along a timeline at the top. You can then add customisable transitions and effects.



You can even add titles to your project without leaving *Premiere*, making the program a comprehensive production studio.

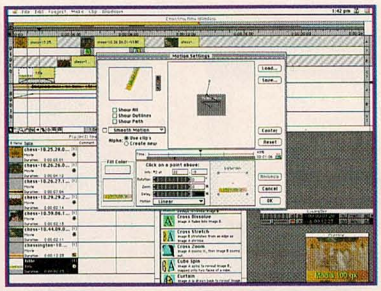
a separate construction window, plus extra windows for info, the transitions you have available, commands and previewing the current state of your project. And then on top of that, if you want to add titles or make these tumble in from the top of the screen, you get further windows to control those functions. It's no wonder that *Premiere* buyers often choose to get an extra monitor and use two at once, with the necessary windows arrayed across both at a usable size.

As well as employing the range of effects possible within *Premiere* – adding various "wipes" or fades, for example, to make transitions between scenes more interesting, or playing with colour balance and other parameters – you can use dedicated effects software to tweak your movie in all kinds of imaginative ways. Turn to page 74 for a detailed look at Adobe's specialist *After Effects* and the imaginative *Final Effects* plug-in filters from MetaTools, the company behind *Kai's Power Tools*.

Coming attractions

The major alternative to *Premiere* was *VideoShop* from Avid, the company who really made non-linear editing happen. You might still get a cut-down version bundled with some video cards, but at the moment the software is not available separately because it has been bought up by Strata, which is best known for its high-end 3D program *StudioPro*. Strata is working on a revised version of *VideoShop*, but it won't be out for a good few months yet. Watch for a full review in MACFORMAT as soon as it appears.

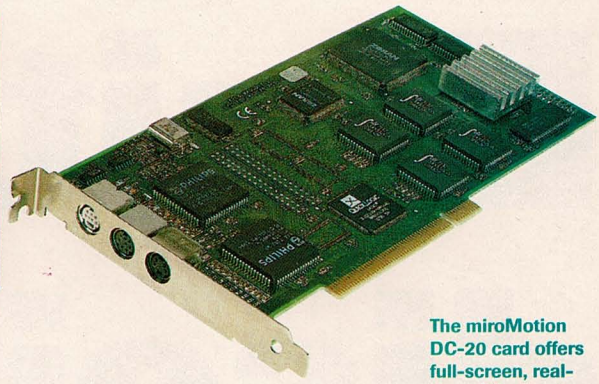
Other developments to watch out for include a new, high-powered card called the Javelin AV/TV, and a new video editing program called *Key Grip*. What makes the latter worth watching is that it is coming from Macromedia, the company responsible for *Director*, which is the de-facto standard software for multimedia authoring, as well as *FreeHand*, *Extreme 3D*, *Sound Edit 16*, *Fontographer* and the *Photoshop* rival *xRes*.It seems that video editing is the one area in which the company hasn't already staked out a claim, so anticipation is high.



Not only can you add effects to your video, you can even animate your titles, making them tumble into shot along a preset path.

Also due any day now is the Avid Cinema card, a board which plugs into one of the PCI (Peripheral Component Interconnect) expansion slots found in modern Macs and provides S-Video and Composite input and output plus the ability to digitise a screen up to 320 x 240 (that's half an average screen), It can record and play back at up to 30 frames a second, and comes with easy-to-use *Avid Cinema* software (but it's this that is the cause of the delay – the PAL version isn't yet finished).

The specs of the Avid Cinema card are not that impressive on the face of it, but what is important about it is that it is targeted at the growing entry-level end of the market and will be priced accordingly. What's more, it forms the heart of the Apple Creative Studio, one of the new Performa configurations which we reviewed in MACFORMAT 42. With the range of bundled software including *Adobe PhotoDeluxe* (a "home" version of *Photoshop*), *Kai's Power Goo Lite*, *Dabbler 2.0* and *Cubasis*, the Creative Studio aims to give you everything you need if you want to dabble in any aspect of creative media. It's not aimed at the professional user, but for under £3,000 it puts video editing within the reach of just about anyone who wants to try it out.



The miroMotion DC-20 card offers full-screen, real-time video capture and compression at 25fps, all for about a fifth the price of previous systems.

In fact, that's been the story over the last year, with the release of miro's impressive miroMotion DC-20 card, for example, at a ground-breaking price well under the £1,000 mark (see our review in MACFORMAT 38) and, slightly higher up the scale, Media 100's QX system at £5,280 (or £7,300 with optional "break-out box" connector panel).

That may seem like a lot of money, but an on-line edit suite costs £200 to £250 *an hour* to hire, and the machines for on-line editing of professional Betacam SP tapes cost as much as *a million pounds* to buy. When you think that a system like the Media 100 QX enables you to produce broadcast-quality programmes in your own home, you'll realise that, thanks to your Mac, the world of films, fun and fame could now be as close as your keyboard. **MF**

- *Adobe Premiere 4.0* costs £530. For more information, contact Adobe on 0181 606 4000.
- Apple Creative Studio (Performa 6400/200 bundle) should cost about £2,700. For details contact Apple, 0800 127753.
- For information on Media 100 systems contact Data Translation on 0118 979 6100 or fax 0118 977 6140.
- The miroMotion DC-20 card costs about £900. For details, phone miro UK on 01494 510250.

How they do it

Turn the page for the inside story of how the professionals at the BBC and Channel 4 used Mac-based systems to make the programs you watch. Plus: the Connectix QuickCam Color reviewed, page 70. *Adobe After Effects* and *KPT Final Effects*, page 74.

Make room for video compression

Mac-based video systems have one major hurdle to clear: digitised footage makes for huge file sizes. It's not hard to see why. The PAL TV system used in the UK has a resolution of 768 x 576 pixels (picture elements). Using a maximum of 256 colours ("8-bit" colour – the colour information for each pixel is stored in eight bits of computer data or one byte), each full screen takes 768 x 576 x 1 = 442,368 bytes. At 25 frames per second, *one second* of full-screen video needs 442,368 x 25 = 11,059,200 bytes or 11Mb. Use "full-colour" instead and you need 24 bits per pixel – 33Mb per second, or 1,900Mb per minute.

Nobody could afford enough hard disk space to hold more than a few minutes of video. And no SCSI device made can transfer data fast enough to play back 11Mb per second – the average is just 3.5Mb a second.

Solutions? Lower resolutions, fewer colours and fewer frames per second certainly help – but who wants to watch quarter-screen films in 16 colours (4-bit colour) at 15 frames per second? And even then, one second of footage would fill up 320 x 240 x 0.5 x 15 = 576,000 bytes or 562.5K. A one minute movie would take almost 34Mb. But that's okay, because you probably wouldn't want to watch more than a minute at that quality anyway.

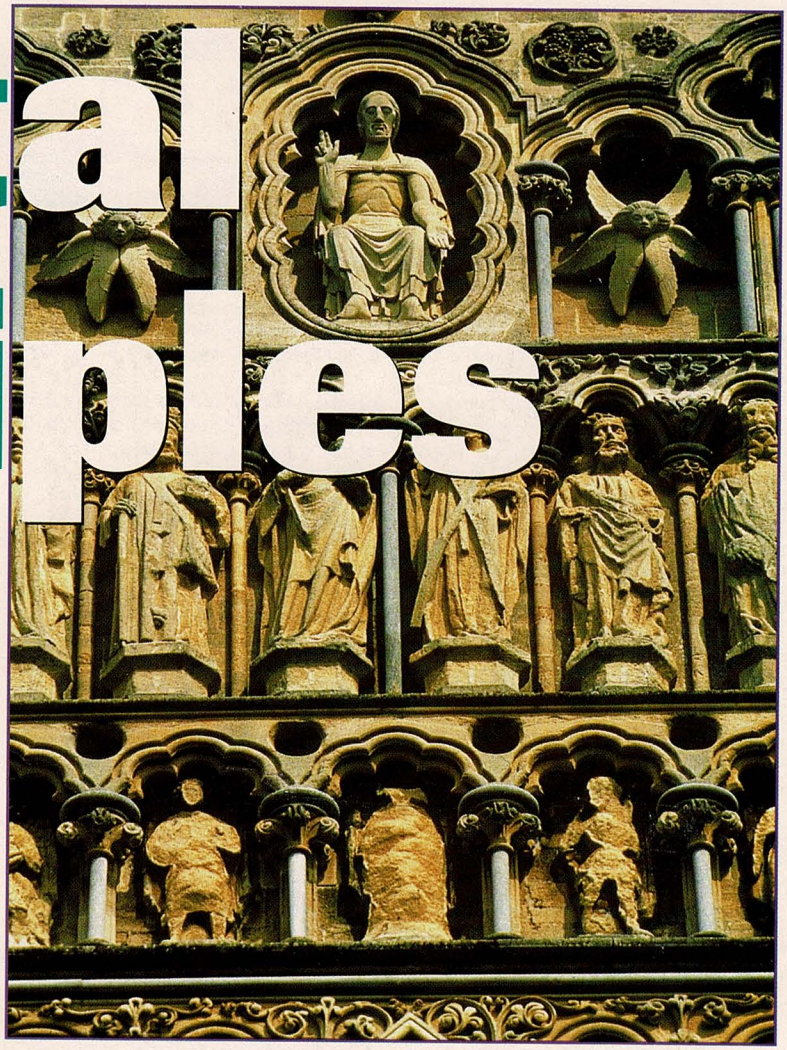
It's for this reason that codecs (compressors-decompressors) are used to squish the size of the video data down, using complex mathematics. QuickTime includes some codecs of its own, but the most common is JPEG (named after the Joint Photographic Experts Group), which is capable of several levels of compression, trading off size against quality. JPEG is built into capture cards for the Mac, and it's one reason for getting one.

The efficiency of the codec also depends on how much it collaborates with hardware. The whole idea of video cards is that codecs can use them to make their calculations that much more quickly. With extra hardware, therefore, you can start with a larger, richer video sequence but still compress it to a manageable size for your storage medium.

The growth of the PowerPC chip in Macs, and other chips elsewhere, means that desktop computers can now cope with the intensive calculations needed to handle more heavily compressed video than their equivalents a few years ago. This is of course being exploited in the new version of QuickTime, but also by a new generation of codecs designed for video on CD-ROM and especially the Internet, including systems called ClearVideo and Power!Video.

We've included a Power!Video demo and sample clip on this issue's Cover CD so you can try it out and see how it compares with QuickTime. The latest version of QuickTime is also on the CD.

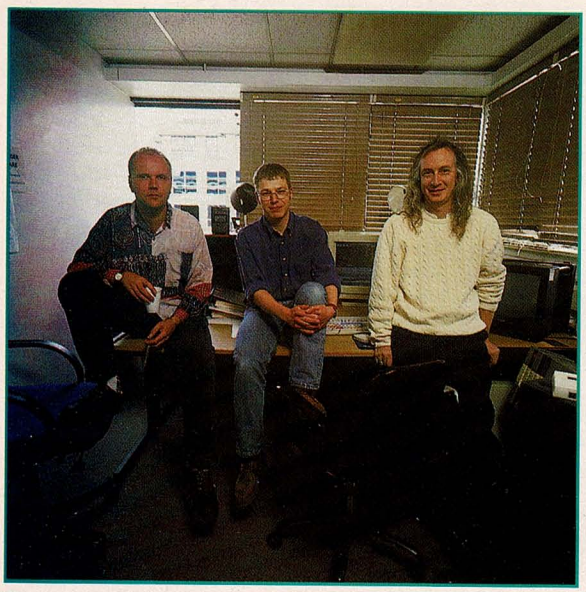
Digital disciples



The Mac has proved to be the saviour of many involved in TV production, as Bob Dormon observed when he went to find out about the making of a new BBC TV series, *Lives of Jesus*.

When I visited BBC North in Manchester to meet the editor and directors of *Lives of Jesus* I had in my mind a darkened room packed full of equipment, whirring away in some kind of shrine to audio visual technology. The reality was very different and a testament to how Macintosh technology has changed people's working methods and environments.

At the far end of the editing suite – a room the size of a small office – was a table with two monitors and a colourful custom keyboard. To one side stood a modest rack unit, stuffed with pro-audio and video gear. It was all very understated, thanks mainly to a Macintosh computer running *Media Composer* software, produced by Avid Technologies.



The team behind the forthcoming BBC production, *The Lives of Jesus* (from left): Director Christopher Salt, Avid Editor Richard Fretwell and Music Composer Glenn Keiles.

The end is nigh?

Having seen one of the episodes from *Lives of Jesus* I was surprised to discover that it's more like a piece of investigative journalism, with learned scholars giving intelligent rather than euphoric opinions on the life and times of one of history's most enduring characters. For some background on the project I spoke to Angela Tilby, frequently heard as the voice behind BBC Radio 4's *Thought For The Day*. She's also the series producer and director of one of the episodes.

"We'd discussed the idea of doing a millennium program on 2,000 years of Christianity, but most scholars believe that Jesus was born in 4 BC. That being so, 1996 would actually be the 'big' Christmas. From reading the huge amount of stuff that was around, it just fell into these four areas that we've made the films about: *Jesus the God, Jesus the Jew, Jesus the Rebel* – based on the sociology and economics of the Roman Empire – and *The Hidden Jesus*, looking at mysterious writings that have been dug up in the last 50 years."

Director Christopher Salt explained that it's been a fine line to tread, as the series examines people who have faith in Jesus, the significance of the next millennium and, as a measure of balance, those that have no interest in Jesus at all. He suggests that the four "themes" are a way of re-interpreting this historic character for the next millennium. Continuing along this contentious tightrope, Chris remarks: "We start the series by saying 'He's lasted for 2,000 years, is he going to last for another 2,000...?'"

A good question. With statements like that I wondered whether Chris had been given any kind of directorial brief about the programme.

There's a time

"Well, I'm producing as well as directing three of the four programmes, so I have editorial commitments as well as directorial ones. But Angela's been great – she's given me a free hand as far as pictures go. And it's been marvellous going to all these great places – though India was rather too hot for comfort."

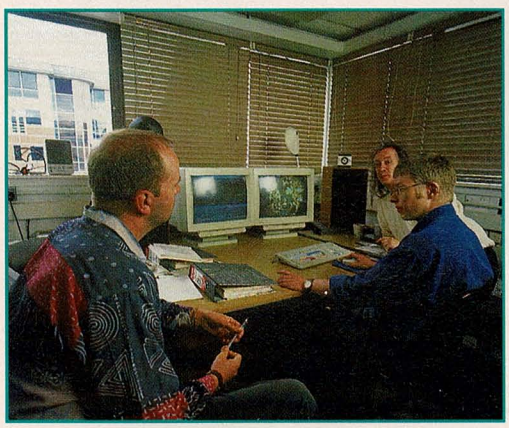
Nice work if you can get it. Indeed, Chris's work as a director and producer is diverse with programmes from *The*

The Manchester home of BBC North is where the technical wizards behind *The Lives of Jesus* work their magic.

Clothes Show to *Comic Relief* as well as a documentary series, *FutureShocks*, also due to be screened at Christmas. *Lives of Jesus* took just over a year to complete, with each of the four episodes lasting 50 minutes. So for a project of this nature, how many hours of film was shot? Editor Richard Fretwell swiftly interrogated his Mac and replied: "15 and a half hours."

That's for a total of nearly three and a half hours for the series...? "No, that's for one programme," he says calmly.

You're pulling my leg! "No, there's a 15:1 shooting ratio on this episode, so for every 15 minutes of 'shot', one minute of that will be transmitted. For the international versions," Richard adds, "extra sequences have to be shot to fill in for the places where the UK presenter Mark Tully appears on picture."



The nerve centre – the Avid off-line editing suite at BBC North (Manchester). Tucked under that desk is a Quadra 950 with PowerPC upgrade and 40Mb of RAM.

It might seem like a waste but, on reflection, while listening back to these interviews, I realised that for all the questions and answers I had on tape, I too was only going to use a fraction of what I'd recorded. It's just part of the creative process.

To complement the film itself, another area of creativity is called into play, namely the music. Sound has previously been the poor relation to picture, but in these days of Nicam TVs and CD-quality audio, much more consideration is given to this aspect of a film or television production. To make sure that the music works with the picture, music composer Glenn Keiles meets regularly with Chris to discuss the soundscapes that will be created to enhance the images on screen. Chris describes his musical direction.

"We're trying not to be obvious... and not be obscure either. As soon as you say 'it's a religious programme' people expect hymns and organs. But we're looking at it from a subjective point of view – the first compositions we had were actually quite pagan. After all we are dealing with a character who was born in the Roman Empire. Yet the themes Glenn has written are adaptable into the four different facets of this essential figure of Jesus."

Turning to Glenn, I asked him whether he had found it frustrating not having a keyboard in the editing suite to sound out ideas?

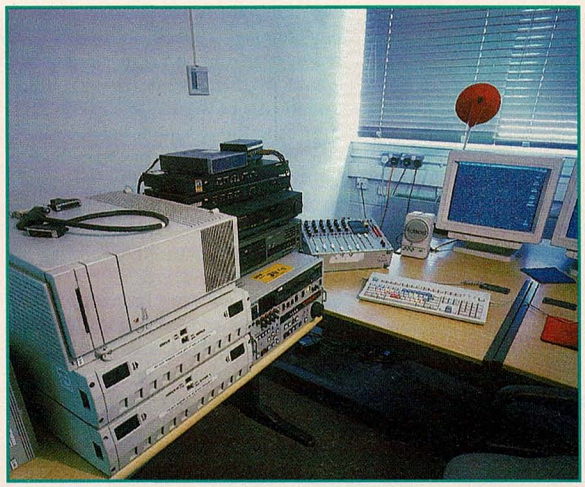
"It's a nice way to work, with Chris firing ideas at me and Richard throwing images at me. They tell me how they feel about the scenes and I get inspired by that. I go away and think about it, then put some musical ideas on DAT, see what they like and don't like, and move on from there." For more details on the technical side of Glenn's music production, see the box "The Conversion Experience" on page 37.

Revelation

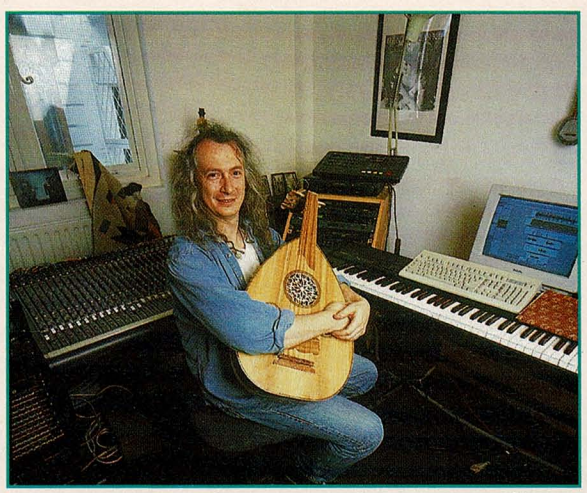
The music and video sides are in fact surprisingly close in another sense too. If you've ever used a typical MIDI sequencing software package, such as *Cubase*, then you'll notice some similarities with *Media Composer*. Sections of video appear on the screen as simple horizontal blocks or parts of varying length. A cursor moves across the screen and plays back the video (and audio) represented by these parts. You can reposition and resize these parts on the screen. Another monitor is used so you can observe your edits. The size of the output screen can be varied to make room for any particular tools or windows required by the editor. The audio can also be seen on the edit screen, and these tracks can be dealt with separately. Richard remarks: "I tend to work on one or two video tracks – generally with just one, the other being a scratch pad area which I can copy stuff onto to try things out. If it works, I'll drop it back in the main video track."

Okay, so you can move around stuff you've already got on the screen, but how do you audition new stuff that you might want to use later?

"Every editor will have their own ➤



Another editing suite, including Mac, multi-gigabyte hard drives and a black stack that made up of ProTools interfaces, Panasonic VHS video and Sony DAT and Betacam video machine. Phew!



In Glenn's studio there's a fascinating mix of the old and the new. Glenn's holding an Ud – an Arabic lute – but surrounding him are his Yamaha keyboard, an ADAT BRC remote controller, a Mackie 8-bus console mixing desk and stashed away in his cupboard is a PowerMac 7100 with 32Mb of RAM and an external hard disk.

The power to save

So what sort of equipment is the team using? Lurking beneath the edit suite table is a souped-up Quadra 950 fitted with a Power PC upgrade and 40Mb of RAM. This is, in turn, hooked up to a 14Gb external drive. This set-up is used to run Avid's *Media Composer* software, which enables the series editor Richard Fretwell to produce Edit Decision Lists (EDLs). The reference for this type of editing is a timecode that is recorded alongside the video. Richard comments: "We're doing EDLs here, but we've got two systems downstairs which are 'on-line' broadcast quality. That whole equation between the external storage available and how much material you need to manipulate, determines whether you go down the on-line or off-line route. Working at broadcast quality, the files are much larger. You tend to find that 'magazine' programs – which have a shorter shooting ratio – will work in an on-line environment. The majority of the work we do here is off-line. That's because the shooting ratios tend to be huge for documentaries of 30 minutes or more."

set of working protocols, but they all rely on 'bins'. I have a 'rushes' bin that is ordered in slate number, a 'bits and bobs' bin and an 'original sequences' bin – the very rough cuts of the sequences that will constitute the program. I always store them. These are the bits that change. You can have so many versions of things: an Editor's cut, a Director's cut... it's the best video game, because you've got something positive coming out at the end of the day. It really is fun.

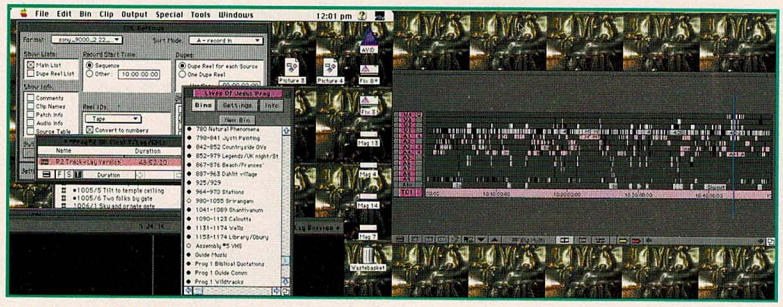
"Anyway, today Glenn has come in to discuss the music and I've made an assembly copy which I'll save as a reference. This is because he might come in one day and there'll be something different in the sequence from what he was originally shown. I can pull out that assembly file and review those old edits. This is again the beauty of it. As these files are just 'parameter' files, they don't physically change the recorded film, just the order it is shown. A 50 minute program is a huge file, so I'll split it into thirds to work on. That's my intermediate step between original sequences and final assembly."

More of Glenn's amazing technology – from the top: an Akai S1100 sampler, a Yamaha TX802 synth, a SyQuest EZ135 removable drive and MOTU MTP II MIDI patchbay/ synchroniser.

The last things

Once the edit decision list (EDL) has been finalised, that information is used to compile the program from the original uncompressed film or video to create the broadcast quality finished product. Film is transferred or telecined to video first, and then as with the old video editing method outlined earlier, the video is played from multiple machines and recorded onto another to make a master copy. However, the process is automated – something made possible by referring to the timecode in conjunction with the EDL. Apart from the film transfer to the Avid to produce the EDL, this will be the only time the original footage will have been played.

"You can use 'Auto Assembly', where the Avid controls external machines including vision mixers and so forth. An EDL is just ASCII text really, tabulated differently for particular machines. With most off-line editors you have alternative save options as you do on a word processor. At BBC North we're a Sony operation so we save the EDL file in a format compatible with the Sony 9100 Edit Controller for our on-line tape to tape operations."



This picture of Avid's *Media Composer* software shows the edit decision list settings in the left hand side background, while in the foreground is a list of Richard's different 'bins'. To the right of the screen, the complex video and audio sequences are lined-up.

On the left of this picture are head frames – thumbnail pictures that represent the beginning of video files. The right hand side shows more audio visual sequences, ready to work on in *Media Composer.*

And the music? You can use up to 24 tracks of audio with *Media Composer.*

"Yes, but the problem here is we've only got a four-channel *ProTools* audio interface, so I tend to work with only four when I'm 'cutting'. On this particular programme we'll have a narrator's track, Glenn's music track, Biblical quotations which themselves can span four tracks, a main dialogue track (for interviews and so on) and then we'll have three effects tracks. It blossoms out. I work in mono as it's a matter of 'how much material do you want on board?'"

Richard sub-mixes various tracks into one mono track, but the sub-mix doesn't get converted to an EDL as it's only a composite of various audio track levels.

The conversion experience

Like many a muso, Glenn Keiles' MIDI sequencing erudition came from first operating an Atari computer, before making the move to Mac.

"An Atari, for the price it cost and the time it came along equipped with MIDI, was brilliant. It opened doors to many avenues, but one soon became aware of the fact that you were working with a games computer, not meant for professional use – no hard disk. Sooner or later you have to break away. For example, you're sitting in a recording studio and your Atari keeps crashing because the disk drive is held together with elastic bands. On the other side of the glass, you've got a 90 piece orchestra. It's just *not* the time to have a computer crashing on you."

So you bought a Mac. I know it's a stupid question, but why not a PC?

"I was working with a number of composers and simultaneously about five of us upgraded to Mac for its reliability. I realised that the Mac is definitely a media tool. For book-keeping and office work you can choose either, but when it comes to media you have to run with the Mac. So I bought a IIvx, which was a marvellous initiation to Apple computing. Going from an Atari to a IIvx was like going from a milk float to a Mercedes. But from a IIvx to a PowerMac, I feel I've got the top of the range model with the wood finish and a cocktail cabinet in the back! I'm running PowerMac native software now, so everything has speeded up."

The crossover from the Atari to the Mac is a lot easier than to PC. Just looking at the ST, it seems that there's a lot in common with the Mac. Richard continues: "That was so easy. I can just MIDI-file some old stuff from the Atari and bring it straight into the Mac."

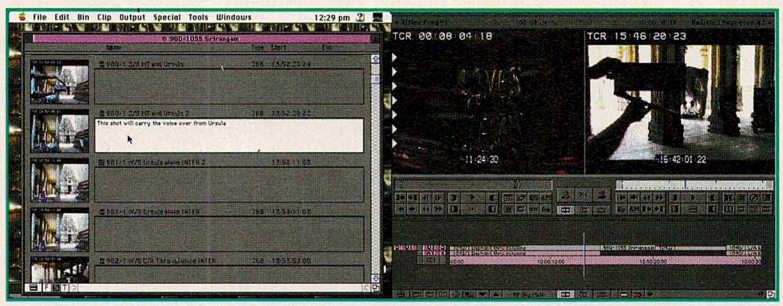
Really, you don't use the import Notator/ Creator song features on *Logic Audio*? "No, I'm too lazy to go through the Arrangement-to-Pattern process. I have to slate the old *Notator,* along with the Atari, as working in patterns caused a lot of problems."

***Notator Logic* has incorporated the *Cubase* approach to arranging MIDI tracks... "Yes, they've taken the best bits of *Cubase*: the linear tracks and the tools." Joking, Glenn adds: "Nick as much as you can, that's my motto!"**

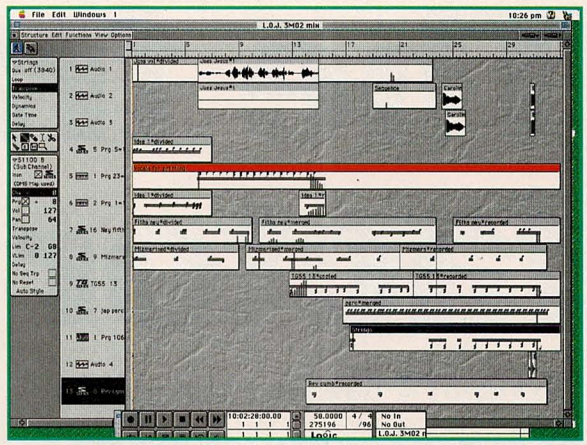
So why didn't you go for *Cubase* in the first place? Do you have a particular soft spot for Emagic software?

"No, when I bought the Mac I re-appraised the whole situation. I saw two things: one, Steinberg still hadn't got their act together on *Cubase* as far as musical notation was concerned – something that I use all the time. And two, a year ago *Cubase Audio* had many problems with the audio and I needed that to be reliable."

Below *Media Composer's* **Effects** palette you'll find the somewhat cryptic and rather complicated looking **Command** palette. Once more, on the right hand side are another series of audio visual sequences.



An on-screen storyboard (on the left) is used to remind the editor of the tasks that are necessary to complete a particular scene.



Notator Logic, Glenn's MIDI program of choice, combines some of the best bits of a *Cubase*-style approach – the linear tracks and tools – while also providing strong musical notation support.

He does it for editing convenience – the original tracks are still available for the fine cut.

So is there anything in particular that you miss about the old ways of film editing...?

"Generally, people who use these non-linear systems are from a film or tape editing background. We are seeing the first generation of students here that have neither. That's scary actually. Coming from a film background, I personally miss that little bit of romance of the cutting room. It's a routine with almost steam-driven technology.

"Yet the editing capabilities of systems like Avid are way beyond what you can do on film, as you can work much faster and to a finer degree. As with all new technology, though, there was a lot of reticence towards it from all sides: people were afraid that they wouldn't be able to adapt, producers were initially intimidated by it and didn't know what their editors were doing. Yet in three years of using *Media Composer,* I've never had anyone go away saying that it was an unpleasant experience."

It all seems to have been a great success. BBC1 will be screening *The Lives of Jesus* just before Christmas, and there will be a CD of Glenn's music to coincide with the transmission.

If you get the chance, watch the programme; it's a series that sets out to intrigue you rather than convert you... and more importantly, both the sound and vision have been blessed by the use of a Macintosh. **MF**

The number of the beats

Glenn Keiles has been involved in music for TV for some time now. His work has varied, from children's TV programme *Treasure Islands* to the more serious *Everyman* and *Brains Trust* series. For many years he was right hand man to composer Barrington Pheloung, programming the orchestral sequences for *Inspector Morse,* which would be printed out as a score Barrington would later use to conduct a real orchestra.

Glenn now uses audio together with MIDI sequencing – a revelation or what? Glenn replies: "It's become a necessity for my way of working now, even though I have an Alesis ADAT [a tape-based eight-track digital audio recorder that uses S-VHS videotapes as its storage medium]. For instance, my brief for *Lives of Jesus* was tribal, ethnic music with ecclesiastical overtones. I was given the episode 'Jesus the Jew' to work on and drawing on my own background I took a few lines of my bar mitzvah as a starting point. I thought, obviously the guy had a bar mitzvah because he was a Jew."

Glenn explained that he recorded a musical drone for his singers to tune to and wrote out some phonetic phrases that sounded like Hebrew for them to sing. He used a number of singers (all with different styles and vocal ranges), and recorded all their performances onto Alesis ADAT. Returning to the studio he was then able to transfer his choice of performances to his Power Macintosh, running either *ProTools III* or *Logic Audio* software. These powerful audio tools utilise hard disk recording, where multi-track CD quality audio can be digitally recorded to a hard disk and accessed instantly. No more waiting for the tape to rewind – just press play! Another advantage is that you can move the audio tracks around, vary their length and repeatedly Copy, Cut and Paste sections of audio in a non-destructive way.

"Having the facility of hard disk recording meant I could arrange the voices and write music around them. The alternative would have been to write something first. That would have taken much longer. I love having the speed of being able to send music cues to the director for approval, especially as he can hear it before he starts editing the picture. That way, he can have my music in mind so that it becomes a generic part of the programme rather than something that's slapped on top later.

They actually sent back a videotape with my vocal music on showing the sections that they liked, mentioning places where they wanted changes in orchestration or new pieces. On seeing this I simply made the refinements they wanted."

Taking his ethnic music seriously, Glenn took a business trip to Morocco and Egypt (again, nice work if you can get it) to buy some ethnic instruments, which he actually played and recorded for some rhythmic passages. By running his computer in synchronisation with the videotape (utilising the same timecode that's used for video editing), he could move the audio he created around his Mac screen to fit exactly with the timing and length of the video picture.

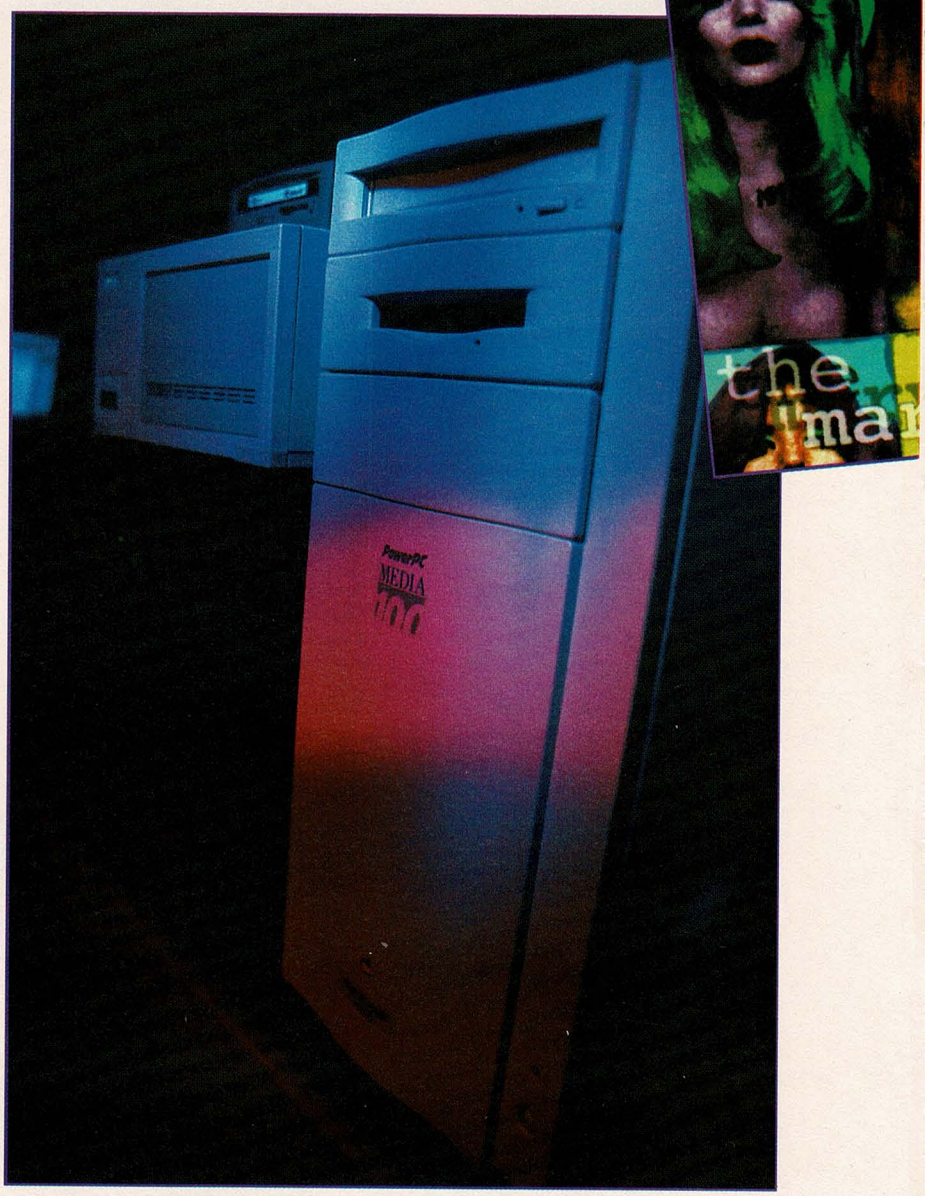
"For me, being able to run hard disk audio in tandem with MIDI sequences is the biggest technical breakthrough I've experienced since the time I first switched on a MIDI sequencer. It's absolutely amazing. You have to take into account that *Logic Audio* is one program that tries to do 20 jobs. It does 15 of them stunningly well and the other five well enough to get on with. But when it comes to editing audio only, Digidesign's *ProTools III* comes into its own in a big, big way. It's fast, it's accurate, it's a very complex tool made very simple.

"The final I thing I must say is that I try to avoid technology as much as possible. I try and compose – it just so happens I know how to work a few implements."

Amen to that!

The frame factor

Channel 4 has just broadcast its first documentary edited on-line with Data Translation's Media 100 non-linear system. The programme's associate producer, Geoff Holder, looks into the future of video editing.



Dramatic technology, even without the dramatic lighting – the Media 100 Tower System and its associated RAID array. Is this the editing suite of the future?

ON THE CD

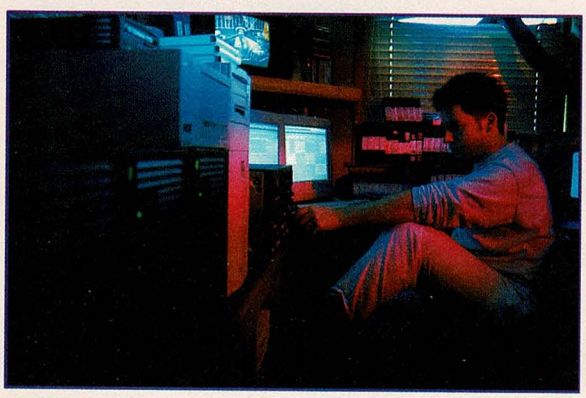
Media 100 sample film (not Mary Millington, alas...)

Speakeasy is a Scottish television production company based in Perthshire, a long way from the metropolitan locations of the traditional high-end on-line edit facilities. In October this year, Speakeasy delivered a 52-minute Channel 4 documentary entirely off-lined and on-lined on their in-house Media 100. It was the first time that Channel 4's famously quality-conscious engineers had accepted a full programme on-lined on a non-linear system.

The programme, *Sex and Fame – The Mary Millington Story*, was part of Channel 4's high profile "Fame Factor" zone. It told the story of Britain's tragic sex queen Mary Millington, who committed suicide in 1979. All the footage was shot on the traditional Betacam SP professional format, but after that everything was done on the Media 100. As Jim Adamson, the programme's producer and director, emphasises, "There is not a single image in the entire programme which was not produced through the Media 100, using either their software or some other third party software. Titles, captions, graphics, special effects, transitions, everything. Nothing in the programme was done on a conventional linear edit suite."

Clip art

A "dissolved" clip is where one image fades bit by bit with another replacing it simultaneously.



Her Majesty the Queen makes an appearance on the monitor as Speakeasy's Editor Magnus Wake works at the Media 100.

It's in the bin

The programme was edited over six weeks by Speakeasy's Chief Editor, Magnus Wake. "Editing a programme on the Media 100 is relatively straightforward," he says. "You set up a project which contains a programme timeline. You can have as many timelines as you like in a project. For instance, because we had an hour slot on Channel 4, this meant the programme had to be in three parts. So for convenience we had three timelines, one for each part. For the off-line, you digitise your footage at a very high compression rate. There are 25 frames in each second of video, and we used 5K/frame, which is the lowest resolution the Media 100 can sustain. This gives a picture quality comparable to VHS. We digitised over 20 hours of footage at this rate without the slightest problem.

"You also have 'bins' where you can store all your footage. You need to classify these bins. For example, we had a lot of shots of Soho, so we had a 'Soho' bin; we also had bins for archive footage, stills and so on, and interviewees were

On-lined and off-lined using entirely non-linear systems, Speakeasy Productions' *The Mary Millington Story* made history as the first such documentary ever to be broadcast by Channel 4.

Mary Millington's story

Mary Millington was the British sex superstar of the 1970s. Her rise to fame was meteoric, controversial and scandalous. She starred in pornographic films, slept her way through high society and amassed a substantial fortune.

Born Mary Quilter, she married as a teenager in South London and worked as a veterinary nurse. Needing money to pay for her mother's cancer treatment, she started posing nude for men's magazines and appeared in photographer John Lindsay's underground hardcore pornographic films.

"The Tooting Marilyn Monroe", they called her. Did Monroe ever toot?

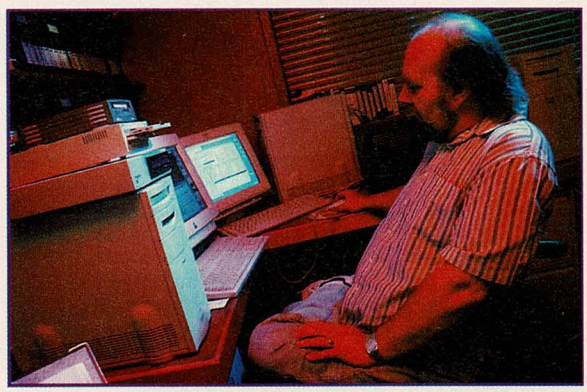
At 28 she was discovered by publisher and entrepreneur David Sullivan, who re-invented her as Mary Millington and took her to fame – and misfortune. She was arrested several times both for possession of obscene material and shoplifting, took to cocaine, and her career declined.

Millington modelled her life and persona on that of her idol, Marilyn Monroe. Like Monroe's, Millington's end was both sudden and tragic. Her downward spiral that took her through prostitution, kleptomania and drug abuse culminated in her suicide on 19 August 1979. She was 33.

put into separate bins classified by their names. When you come to make your programme you drag your video clips from these bins onto your timeline and build your programme up in a traditional cut-and-paste manner. It's non-destructive and completely flexible. As one of our less technically-literate members of staff commented, it's a bit like word processing with pictures. When you've actually built your programme and you're happy with it, you go to the on-line stage. You redigitise the entire timeline. The computer asks for the tapes and redigitises the timeline at 360K/frame, which is Digital Betacam quality. This stage takes up a phenomenal amount of disk space when you're making a 52-minute documentary."

He's not joking. Speakeasy had the top of the range system from Data Translation – the Platinum Contract. This gave the company a Media 100 with the Vincent Engine v2.6, a PowerMac 9500/132 running System 7.5.3 with 144Mb RAM, and a 16Gb Rorke RAID with a "Fast and wide" SCSI interface. But although all this was fine for the 5K/frame off-line, when it came to the 360K/frame on-line, additional help was required. Data Translation loaned a 16Gb RAID, and Speakeasy's distributor Heriot Video loaned another, giving a 48Gb daisy-chain for digitising. Probably close to an hour and 20 minutes was actually digitised. When rendering, say, a slow motion sequence, the Media 100 and other systems both render the slow-mo *and* retain the original shots at their normal speed and length. Consequently you end up with two sets of digitised images whenever you do any kind of effect, and that includes commonplace transitions such as dissolves – a separate "dissolved" clip is digitised, as well as the original clips.

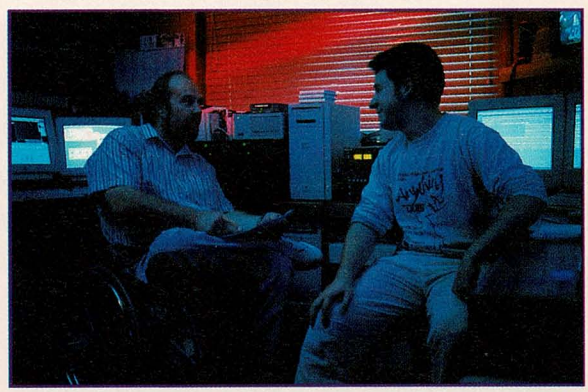
As Magnus was going to be the system's designated driver, he needed to be comfortable with the Media 100. "It was a very quick learning curve. If you're familiar with the main graphics packages that the Mac is famed for and you hit a snag, you can generally deal with it. One of the great things about the Media 100 system is the fact that is all based on the one system – QuickTime. This goes from image compression for a still to compression of the actual video footage. This means you can take it into *Photoshop*, you can take it into *Adobe AfterEffects*, quite literally do anything you want. And that essentially is what makes Media 100 work so well. You can take your footage into third party software and do what you want with it."



Producer/director Jim Adamson produced the title sequence in *Infini-D*, using a PowerMac 8500 linked to the Media 100.

All keyed up

Before starting to shoot any material, Jim Adamson had set out the programme's aesthetic. "I knew we were going to ➤

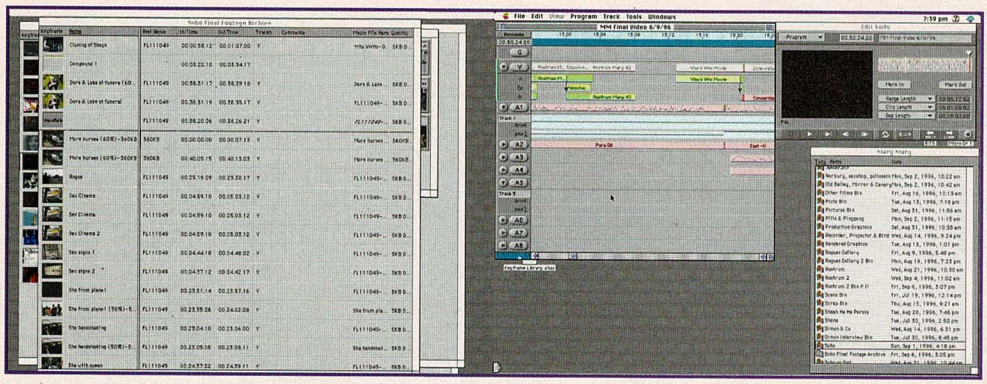


Surrounded by technology, Producer/director Jim Adamson (left) and Editor Magnus Wake discuss the script.

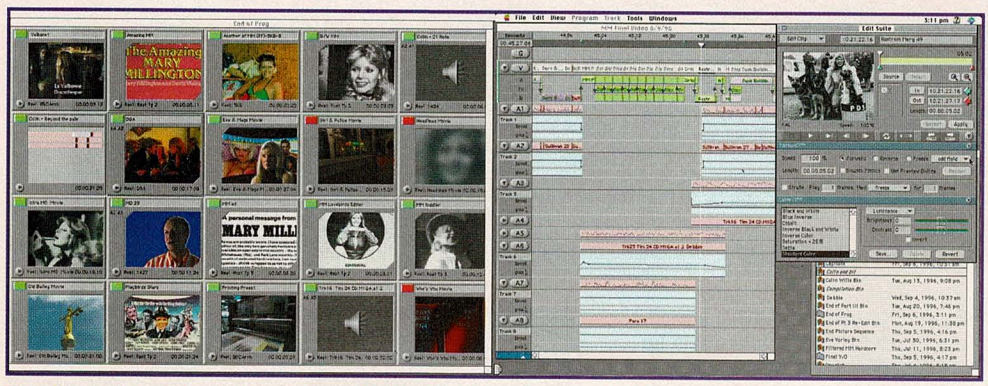
Put in the picture

People are often interviewed against a blue background in the studio, but this is not what appears to the viewing public. This "Chromakey background", as it's called, can be replaced with any suitable backdrop. It's exactly the same technique BBC weathermen use: the maps are only keyed in later, so Michael Fish or John Kettley are actually just waving their arms at an empty space. That could explain a lot!

Sometimes in the past, the keying-in was not perfect, though. When someone in a low-budget science fiction film cries "Look, there's the giant scorpions!", the beasts themselves almost inevitably appear with a slight line or halo around them. This is known as "fringeing".



On the left, the bins are displayed as list, with video clips identified by their first frame. On the right are the programme timeline and edit suite. Clips are taken from the bins to the edit suite and finally placed on the timeline.



The clips on the left hand side can be easily identified from the expanded thumbnails that represent their first frames. Again, on the left you can see where the material is worked on in the edit suite.

shoot a number of interviewees against a blue Chromakey background, so that other images would be placed 'behind' them in the edit suite. I also wanted to use a number of slow-motion and other post-production techniques to give the programme a distinctive style that pointed up the high production values of the project, and made the best use of the considerable archive material we were going to use."

Keying has caused problems in the past, with some non-linear systems producing keyed figures with the "fringeing" familiar from low-budget science fiction films (see "Put in the picture" on page 39). "The one thing engineers in broadcasting companies have worried about in the past is the inability to key properly," says Jim. "Although its keying ability at the moment isn't too bad, the Media 100 itself isn't quite up to scratch yet. We suspected that the next Media 100 version will contain *Ultimatte* as the plug-in for keying, so we got a copy of *Ultimatte* from Data Translation on loan. The keying on *Ultimatte* is stunning. One of the big facilities houses in London, when they saw it, said 'we are worried' – nobody believed you could key like this in a digital non-linear edit suite. *Ultimatte* will be one of the killer blows in the Media 100 upgrade package – it is so much better than anything else on the market."

Magnus adds, "For a lot of the special effects we took the video footage as QuickTime files into *Adobe After Effects*, and it would be there that we'd assemble the special effect. *AfterEffects* is basically *Photoshop* on a timeline, so as time progresses you can bring in multiple effects on layers, as you do in *Photoshop*. *Ultimatte* is just one of the effects you can put on one layer, so if you have someone sitting there with blue behind them you can use the *Ultimatte* effect on that layer to 'replace' the blue.

"You can also manipulate other layers. For example, we used a *KPT Final Effects* filter, called Spherize, to curve a set of still images passing behind an interviewee. And as this was using layers, you could also have, behind all this, another background image coming in and out of focus. It's on a time base, so you just put a blur on it, take the blur out then increase it again, as the timeline progresses. You can put drop shadows on, multiple images, anything. *AfterEffects* is unbelievable – you can do anything you can imagine. In fact it will do most things that really expensive top-end effects systems like Quantel or Flame will do, but it will not do them in real time – it does take render time to do them. But it is fantastically powerful for the money.

"Some of the effects we were using took a serious amount of time to render. In one case it took 12 hours to render one 30-second effect, and that was with a high-end Macintosh running at 132MHz. The programme's 3D title was done in *Specular Infini-D*, using extruded text, with a PICT image frame-grabbed from one of the location shots as the background environment. *Infini-D's* latest feature, Superflare, was used to give a flare on the lighting system. The final render of the 15 second sequence took about 10 hours."

After the break

A "drop frame" is simply a small break in the film where the timecode has stopped – see "Missing time?" for an example of when this can happen.

World of support

Magnus has mixed opinions on Data Translation's support, though: "Our suppliers, Heriot Video in Edinburgh,

The on-line editing process requires data at 350K/frame. For a 52 minute programme this takes up a huge amount of storage. Speakeasy used this 48Gb RAID array system.

Plain captions

The construction of the captions wasn't quite as straightforward as the video effects, Magnus relates: "We initially did our captions in *Photoshop* and imported them, but they were not very good. For some reason, when you import images into the CG (character generator) they go out of focus. So we constructed plain captions in the CG itself and just faded them in and out. However, if we had wanted to do something more sophisticated, we'd have stretched the CG beyond its limits. We could have got round the problem by constructing the captions in *Photoshop* and taking them into *After Effects*, but that's a laborious way to do it. There is definitely room for improvement here."

Doesn't sound so good

Magnus wishes something could be done about the system's sound editing capabilities: "The only post-production work that we had to do outside the office was sound design. The sound on the Media 100 is fairly basic. You get eight tracks of sound, which essentially give you four stereo tracks. It's quite crude how these are controlled. In contrast, *Premiere* offers you a much greater number of soundtracks. What's more there's no EQ (sound equalisation) on the Media 100, so you cannot 'smooth' the sound. We always need to do a sound dub in a specialist sound edit suite."

The equipment list

1 x Media 100 PCI V2.6, inc. Vincent Video Engine, Junction Box, CG Option, FX Option, EDL Option, HDR Option & Power Option.

2 x 17-inch Radius Precision View multiscan monitors
1 x Panasonic 14-inch colour television monitor
1 x PowerMac 9500/132
1 x DIMMS (144Mb)
1 x Rorke Data 16Gb Max Array (expanded at on-line to 48Gb)
1 x Alto Twin Channel accelerator card
1 x *Boris Effects*
1 x *Adobe AfterEffects*
1 x *Infini-D*
1 x Sony PVW21800 Betacam SP VCR
1 x EZ 135 drive
1 x extended keyboard
1 x powered speakers
2 x ATI video cards

Supplied by Heriot Video, Edinburgh – 0131 337 7813

have been excellent. However, Data Translation is a bit like Apple in the way it treats its customers. They will sell you a product but they don't give you a huge amount of support. We did get some help from Data Translation in this country, but there were a couple of problems when we couldn't get hold of anybody in Britain simply because it was a late hour, and the American Data Translation people refused to help us, or even talk to us. There seemed to be some confusion as to how the Platinum Contract works here and in the US. And while they are focused on improving compression rates, they won't try and improve timecode errors. There's a very extensive customers' wish list on their Web site."

However, a sense of perspective is extremely important here. Speakeasy has just delivered the first hour-long broadcast documentary on-lined on the Media 100, to universal technical acclaim. It's obvious that the benefits of the Media 100 more than outweigh the minor quibbles over the small areas that are in need of improvement.

And what does the director, Jim Adamson, think? "It was a challenge for us to produce a programme without actually hitting a facilities house. We did face a fairly steep learning curve. At the end of the day, notwithstanding the caveats we have expressed and the occasional tribulations we faced, this is stunningly high quality video output from a Mac system. I wouldn't have believed six months ago you could do this. I think it's stunning, and I'm absolutely delighted with it.

"The Media 100 gives the creative process back to the principals involved in the project. More and more, it will allow production companies to do everything in-house, to experiment, to retain control with a small number of individuals within the production company. The finished quality of the programme, both technically and creatively, has impressed all the television professionals who have seen it. And it was produced in a small village just outside Perth.

"There may be a pointer to the future here. We've heard a lot about the global village. In terms of television production, a system like this, configured to the spec that we have at the moment, allows any professional production company to make programmes anywhere. This is not to diminish the creative side of programme making, but in terms of the technical side of television, programmes could be made in a hut on Ben Nevis if you so desire." **MF**

Missing time?

Not even the Media 100, it appears, is completely perfect. A timecode is the eight-digit electronic number that identifies each frame of video, and timecode reading forms the fundamental technical foundation of all video editing, but there are problems with it. "We noticed occasional problems with slow motion," says Jim. "It turned out it was a fault of the Media 100's handling of timecodes. There is no actual timecode reader in there. In fact it reads the first frame and extrapolates from there, so if you've got camera cuts on the tape – when the camera has been switched off – it will not recognise that and it will tell you at the end that it has 'discovered' some drop frames. So the timecodes sometimes digitise the wrong shot, especially in slow motion. You have to be vigilant."

The Media 100 connection board, Betacam SP deck, tower and RAID – the nerve centre of the editing process.

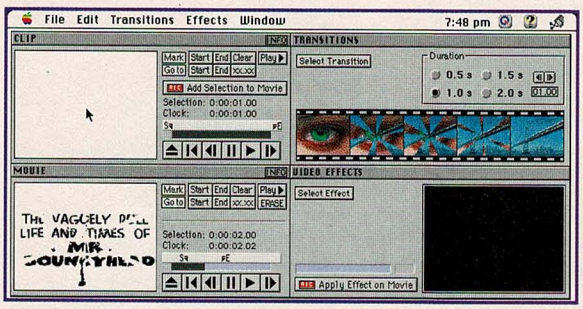
Media 100 – rated

MACFORMAT invited Speakeasy Productions' Jim Adamson (Producer/Director) and Magnus Wake (Editor) to give the Media 100 their marks out of ten:

Ease of use	8
Interface	8
Effects packages (built in)	6
Effects packages (external)	9
Sound quality	9 (CD quality)
Sound manipulation	5
Picture manipulation	5
On-line capability	8.5 (as high as you're currently get without going to Quantel Edit Box)
Speed	7
Support from the dealer	8.5
Support from the manufacturer	6 (worldwide) 7.5 (UK)

QuickEditor basics

Some of the movie-making tricks described in our feature are easier than they might at first appear. Stand aside, Mr Spielberg – follow our simple guide and get started in video editing – all you need is on the disk!



The main window of *QuickEditor* comprises four sections: Clip, Movie, Transitions and Effects. Use these to edit your movie.

ON THE CD

Find everything you need on the CD and floppy

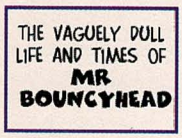
The art of movie-making and editing does not begin and end in Hollywood – and now, with the help of *QuickEditor*, you too can have a go! *QuickEditor* is made up of four windows – **Clip, Movie, Transition** and **Effect.** The **Movie** window is used to create your movie, the **Clip** window to load in and manipulate the clips you plan to add to your movie. Both the **Clip** and **Movie** windows feature **Play** controls, above which sit sliding bar meters to signify just how far through each clip you are. By sliding the bar or working through the movie visually, you can place **Start** and **End** markers onto the meter, which you can then use when editing.

The **Clip** window also contains a button for adding your selection to the movie – this is where the **Transition** window comes in. If no transition is selected, the **Add** button will simply add your clip selection to the movie that is currently open. If, however, a transition is selected, it will be applied to the clip as you add it.

For a better idea of how the whole process works, we're going to add a title screen to the Cover Disk movie, *Bouncyhead*. This tutorial will cover all of the important techniques there are behind editing any small movie.

Bouncyhead

The original Mr Bouncyhead movie was created by MACFORMAT cartoonist Bob Lynch. Turn to page 135 to check out some more of his work.

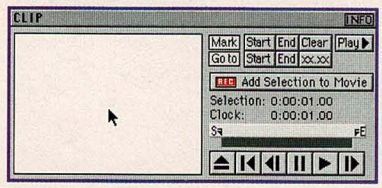


It's easy to create yourself a title screen, using a program such as *GraphicConverter*. You'll need this to complete step 6.

From the top

First of all, you need to create an initial title image, and a blank image to use for your fades. You could also use the fade effect provided, instead of the fade transition – fading to an automatically generated white screen instead of a white picture – but it doesn't tend to produce such a friendly effect.

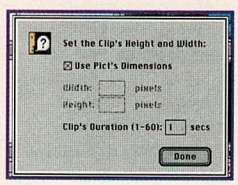
You'll need to work out the exact size of the movie frame, to be able to get the title frame to match. You do this by loading up *Bouncyhead* as a movie (under the **File** menu), and then exporting the first frame as a PICT. Open this image in an art package (*GraphicConverter* is on the Cover CD), clear the picture and replace it with your title text. Beware, though – *GraphicConverter* can add pixels to the width of the frame, so make sure that your finished title frame remains the same size as the movie. While you're doing this, you should also save a completely white, frame-sized picture, as you'll need it to fade to.



Carry out Step 1, using Import PICT as Clip to get your blank PICT into the movie.

This leads us nicely into the really interesting part of *QuickEditor*...

1 Open up the blank, white PICT as a clip, using **Import PICT as Clip** under the **File** menu. When you're presented with the second dialogue (after you've selected the blank picture), check the box to use the PICT's dimensions as the frame size, and set the clip's length to **one second.**



After you have chosen your PICT image in step 1, click Use the PICT's Dimensions to establish your frame's size.

2 You're now ready to create a **New** movie, again using the **File** menu. When prompted for a size, check the box to use the clip's dimensions.

3 Using the slide bar, go to the beginning of your clip. You hit the **Start** button to insert a **Start** marker at the beginning of the clip, then move the slide bar and use the **End** button to insert a marker at the end. Alternatively, you can just hit **[command] A** and, when asked what you're referring to, click on **Clip.**

4 Having placed a **Start** marker at the beginning of the *Bouncyhead* movie, hit the **Add selection...** button in the **Clip** window. The section of the clip you have selected with your markers (in this case, all of it) will then be added to the new movie *after* the starting point.

5 When your movie was created, it was filled with some extraneous blackness (about a second's worth). Using the **Start** and **End** markers again, select this section of the movie and then hit the **Erase** button to get rid of the extra footage – you should be left with a movie that contains one second of white.

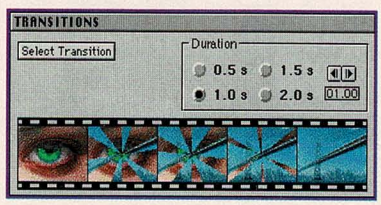
6 As in Step 1, import your title picture as a **Clip.** You're going to paste this into the movie – but instead of simply pasting it in, you're also going to merge it with the blank (white) second using a **Transition.**

7 Using the **Transition** window, you then **Select Transition** from the movie to the clip. Next to this menu, there are four radio buttons that can be used to select the length of the transition – you need to choose **one second.** Again, select the whole clip, but place the movie **Start** marker at the end of the movie. Because you've selected a transition, the pasting will happen before the **Start** marker. This will have the effect of slowly fading the title picture over the blank second. Hit the **Add selection...** button, and watch the fade calculate.

8 Being sure to set the **Transition selection** to **None**, you then repeat steps three and four, to paste in another second of solid title. Again, remember to place the movie **Start** flag at the end of the movie, making sure the new second is pasted on after the fade you've created. Repeat this process once more and you'll have a three second movie – the first second is a fade in, the next is a solid second of title screen, and the third will be used for the transition from the title to the *Bouncyhead* clip.

9 Next, import the *Bouncyhead* clip, as in step 1, and select the whole thing. We're going to paste it onto that final title second, so place the movie **Start** flag at the end of that second. A good transition to use here would be **Radial Wipe**. Then apply the effect.

10 As a final touch, try pasting the *Bouncyhead* clip onto the end of the movie a few more times (remembering to reset the **Transition** setting to **None**) to give the user a few good bounces, plus time to take in your handiwork. Need more help? *QuickEditor* includes its own guide files! **SIMON FORRESTER**



In step 9, select Radial Wipe transition to take you from the titles to *Bouncyhead*.

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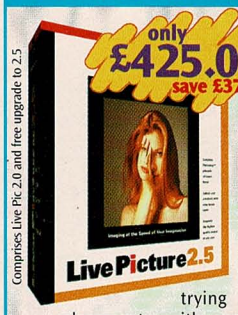

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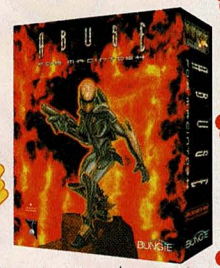

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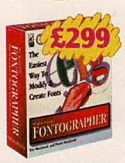

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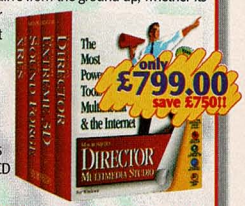

DIRECTOR MULTIMEDIA STUDIO

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HDTK **Hard Disk Toolkit** (the best formatter and checker) £109.00
NUME **Norton Utilities 3.2** (best selling utilities package) £65.00
NOWU **Now Utilities 6.5** (suite of essential utilities) £59.00
POPF **PopUpFolder** (view folder contents with submenus) £29.00
QCKY **QuicKeys 3.5** (macro maker, time saver utility) £59.00
RAMD **RamDoubler** (actually doubles your available RAM!) £45.00
SPED **SpeedDoubler** (greatly improves performance) £45.00
RASP **RamDoubler & SpeedDoubler Bundle** £65.00
THDR **SpellCatcher** (spellchecker, works in all applications) £45.00
SFDL **Stuffit DeLuxe** (famous file compression program) £65.00
SUIT **Suitcase 3.0** (manage your font menus) £49.00
HDTT **Turbo Toolkit** (speeds up startup and Finder) £45.00

PREVENTION & CURE DEPT.

OPDT **DeskTape** (treats DAT as if it were a 2Gb drive) £199.00
MPR1 **MacPrefect** (secures most aspects of the Finder) £30.00
PRSB **Personal Backup** (best value backup on the market) £29.00
RTSP **Retrospect 3.0** (powerful archival backup) ..... from £125.00
SAM **SAM 4.0** (Symantec's anti virus utility) £55.00
VIRX **Virex 5.66** (best virus tracer & eradicator of all) £59.00

SCREEN SAVERS

AFDK **After Dark 3.0** best selling screen saver) £18.00
LTSS **Looney Tunes** (famous cartoon screensaver) £17.00
TTWCD **Totally Twisted** (outrageous and irreverant, CD only) £17.00

EDUCATION

FROM 3 YEARS UPWARDS

		inc VAT (ex VAT)
KDMH	**KidsMath** (takes kids from counting to arithmetic)	£34.08 (£29)
KDPX	**KidPix II** (wonderful paint program with sound effects)	£34.08 (£29)
NMBM	**NumberMaze** (award winning arithmetic tutor)	£41.03 (£35)
RDMZ	**ReadingMaze** (letter recognition to sentences)	£41.03 (£35)
TYEN	**Typing Instructor** (good training from basics to touch)	£29.38 (£25)

CD ROM

EDUCATION

		inc VAT (ex VAT)
ARTT	**Arthur's Teacher Trouble** (interactive story book)	£28.20 (£24)
ARTB	**Arthur's Birthday** (more Arthur)	£28.20 (£24)
CRWRCD	**Creative Writer** (DTP for kids)	£25.85 (£22)
FNARCD	**Fine Artist** (great fun paint program)	£25.85 (£22)
LJZCD	**Logical Journey of the Zoombinies** (rave reviewed)	£28.20 (£24)
HHHS	**Harry and the Haunted House** (the new best seller)	£28.20 (£24)
KDPCD	**KidPix Studio** (KidPix plus animation)	£28.20 (£24)
WTSCD	**Mr Wonder's Toyshop** (storytelling, music, rhyme)	£29.38 (£25)
RUFF	**Ruff's Bone** (adventures with Ruff the dog)	£28.20 (£24)
HARECD	**Tortoise and the Hare** (the epic race)	£28.20 (£24)

REFERENCE

		inc VAT (ex VAT)
3DAT	**3D Atlas** (simply wonderful)	£45.83 (£39)
MAGCD	**Art Gallery** (Microsoft's tour of the National)	£34.08 (£29)
BKSCD	**Book Shelf** (superb, for everyday reference needs)	£45.83 (£39)
CINI	**Cinemania '97** (19000 movie reviews and more)	£28.20 (£24)
DINO	**Dinosaurs** (the "must have" CD of the year)	£29.38 (£25)
NCRT	**Encarta '97** (fantastic multimedia encyclopedia)	£41.03 (£35)
GRLCD	**Groliers Encylopaedia 95** (21 vols, 9 million words!)	£45.83 (£39)
LLVCD	**Le Louvre** (tour the famous Paris Gallery)	£41.03 (£35)
MICD	**Musical Instruments** (Microsoft's excellent entry)	£29.38 (£25)
MPCCD	**Monty Python's Complete Waste of Time** (not!)	£34.08 (£29)
OEDCD	**Oxford English Dictionary** (the whole thing)	£264.38 (£225)
REDCD	**Red Shift** (superb astronomy program)	£41.13 (£35)
UHBCD	**Ultimate Human Body** (Dorling Kindersly's one)	£29.38 (£25)

ENTERTAINMENT

BEST SELLING GAMES ON CD

			inc VAT (ex VAT)
1)	MRTHCD	**Marathon II** (can you resist?)	£64.63 (£45)
2)	DOM2	**Doom II** (you may have heard of this game!)	£34.08 (£29)
3)	MYST	**MYST** (magical mystery adventure)	£37.61 (£32)
4)	SIMCC	**Sim City 2000 Collection** (with extra goodies)	£41.13 (£35)
5)	PRPCD	**Prince of Persia I & II** (two of the best ever)	£22.33 (£19)
6)	ALRC	**Al Unser Jr's Racing** (arcade car racing)	£25.85 (£22)
7)	DKFCD	**Dark Forces** (brilliant game based on Star Wars)	£41.13 (£35)

BEST SELLING GAMES ON FLOPPY DISK

			inc VAT (ex VAT)
1)	ERIC	**Eric's Ultimate Solitaire** (a dozen patience games)	£41.13 (£35)
2)	A10A	**A10 Attack** (the best flight sim around)	£45.83 (£39)
3)	F18H	**F/A18 Hornet** (from the creators of Hellcats)	£57.58 (£49)
4)	ITG10	**10 Intelligent Strategy Games** (backgammon...)	£34.08 (£29)
5)	BRDG	**Bridge** (not the Golden Gate but the card game)	£29.38 (£25)
7)	FLSM	**Microsoft Flight Simulator** (realistic, accurate)	£41.13 (£35)
8)	LEM3	**Lemmings/Oh No! More Lemmings Bundle**	£25.85 (£22)

NEW GAMES ON CD

		inc VAT (ex VAT)
BRTM	**Buried in Time** (sequel to Journeyman Project)	£34.08 (£29)
IFDCD	**In the First Degree** (play a murder prosecutor)	£41.13 (£35)

NEW GAMES ON FLOPPY DISK

		inc VAT (ex VAT)
ARCD	**Arcade** (collection from Microsoft)	£22.33 (£19)
ISHD	**Ishido** (Chinese strategy game)	£25.85 (£22)

BOOKS & TRAINING

BEST-SELLING BOOKS

1)	BK4075	**Mac Bible 5th Edition**	£29.95
2)	BK5010	**Internet Starter Kit Mac**	£27.50
3)	BK2180	**Macworld Photoshop V3.0 Bible**	£38.99
4)	BK2016	**Photoshop Wow Book**	£32.95
5)	BK6035	**Quark Xpress Book 4th Ed.**	£29.99

ALL PRICES EXCLUDE VAT EXCEPT WHERE STATED

NETWORKING

ANET **LocalTalk (AppleTalk) connector kits** £14.00
FTNP **PhoneNet connector kits** £12.00
FEHA **EtherLan Hub 9** (9 port Ethernet 10baseT Hub) £65.00
FAIR **Farallon AirDock** (Infra Red LocalTalk connector) £69.00
QKML **QuickMail 3.6 10 User** (powerful, flexible E-Mail) £349.00
ASPA **AsantePrint** (Ethernet to AppleTalk printer router) £249.00
ETWx **EtherWave** (daisychain Ethernet from Farallon) £165.00
Ethernet Cards & Tranceivers (Asante, Shiva, Focus) ..... from £25.00

MULTIMEDIA

MRPHB **Morph 2.5** (morph from one QT movie to another) £75.00
MDRT **MacroMedia Director 5.0** (key multimedia tool) 769.00
PRMR **Premiere 4.2** (Adobe's brilliant QuickTime editor) £399.00
VIDD **Video Director 2.0** (edit your home videotapes) £85.00

PC COMPATIBILITY

DSMT **DOS Mounter 95** (read/write PC floppies on your Mac) £55.00
MLPT **MacLink Pro** (best Mac/PC link with100's translators) £105.00
SFWD **SoftWindows 3.0** (Windows 3 for PowerMac) £199.00
SFWE **SoftWindows 95** (Windows 95 for PowerMac) £235.00

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4DFI **4D First Internet Server** (fast, relational server) £109.00
AINK **Apple Internet Connection Kit** (available on CD ROM only) £49.00
HMPG **Claris Home Page** (excellent Web Page creator) £79.00
BK5010 **Internet Starter Kit** (the best book) £36.86
CLEM **Emailer** (great mail program, supports many services) £45.00
EDRAA **Eudora 2.1** (most popular mail package) £59.00
INET **Internet Access Kit** (Internet dial up, email, Web, FTP) £25.00
NTSCB **NetScape Navigator** (best browser, includes manuals) £59.00
NUTW **Now Web Publisher** (put diary/schedules on the net) £95.00
PGML **PageMill** (the WYSIWYG way to create web pages) £65.00
STML **SiteMill** (eases maintenance of Web Sites) £139.00
WBBY **Web Buddy** (makes your surfing easier) £45.00

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CPPA **Car Power Adaptor** (plug in to the car lighter socket) £65.00
PCNA **Ethernet Card** (Farallon 10BaseT PCMCIA card) £175.00
FEVC **MV16** (16 bit colour/10BaseT Ethernet for 5300/190s) £139.00
GPCA **PowerPort Platinum** (PCMCIA 28.8 fax modem) £239.00
TPCM **TDK Modem** (PCMCIA 28.8 fax modem) £215.00

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KBCF **Extended Keyboard** (15 function keys, numeric pad) £39.00
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QCKL **Colour QuickCam** (colour video camera for QuickTime) £159.00
AGMJ **JetStick** (joystick for the control you've always wanted) £45.00
SESY **Security Systems** (is your Mac vulnerable to theft?) ..... from £29.00
TMADD **Thinking Mouse** (4 button with software) £59.00
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WCU6 **Wacom ArtPad II A6** (handy stylus and tablet, inc Dabbler) £135.00
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WCU4 **Wacom UltraPad A4** (professional stylus and tablet) £359.00
VR256 **256K VRAM Chips** (adds more colours) £19.00
VR512 **512K VRAM Chips** (adds more colours) £25.00
VR9A **1Mb VRAM DIMM** (for 7200, 7500, 8500) £45.00

PROGRAMMING

HYPC **HyperCard 2.3** (new version, more power) £89.00
CDWG **Metrowerks Code Warrior Gold v.9** (PowerMac compiler) £290.00
CDWJ **Discover Programming with JAVA** £65.00
THKC **Think C 6.0** (the leading Mac app development tool) £185.00
FTBS **FutureBasic II** (the best Basic for Mac, inc. PG Pro) £179.00

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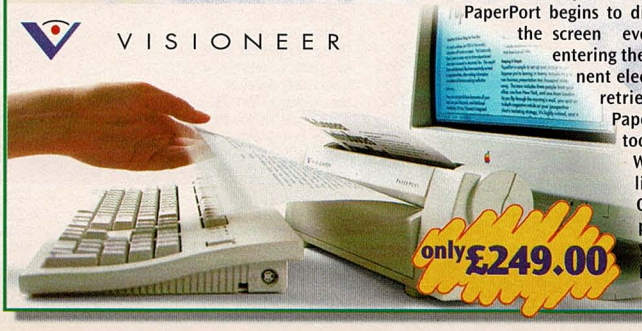

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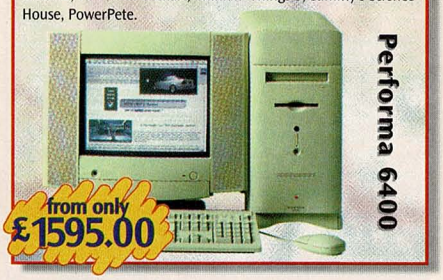
SOFTWARE - Mac OS 7.5.3, Best of European Soccer, Apple Telecom 3.0, Ultimate Human Body, Apple Video Player, Aladdin Activity Centre, Lion King Story Book, Acrobat Reader, Toy Story Preview, At Ease, Grolier MultiMedia Encyclopaedia, ClarisWorks4.0, Claris Impact, Claris Organiser, Internet Connection Kit, MacLink Plus, Full Throttle, HyperCard Player, Descent, Performa Clickart, Thinkin' Things 3, Sammy's Science House, PowerPete.



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THE FAMILY MACINTOSH

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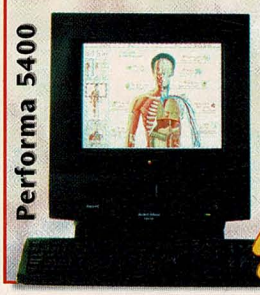
SOFTWARE - Mac OS 7.5.3, The Best of European Soccer, Apple Telecom 3.0, The Ultimate Human Body, Apple Video Player, Aladdin Activity Centre, 120 Letters, Lion King Story Book, Acrobat Reader, Toy Story Preview, At Ease, Grolier MultiMedia Encyclopaedia, ClarisWorks4.0, Internet Connection Kit, MacLink Plus, Performa Clickart, Full Throttle, HyperCard Player, Descent, Thinkin' Things 3, Sammy's Science House, PowerPete.



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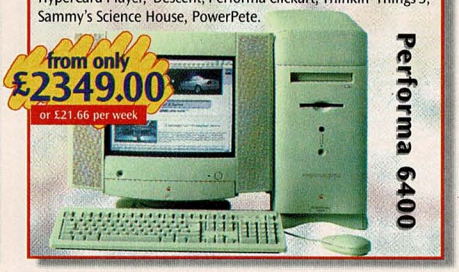
HARDWARE - PowerPC 603e running at 200MHz, 32k internal cache, integrated FPU, 64-bit memory bus, 256K level 2 cache, 24Mb RAM expandable to 136Mb, Internal 2.4Gb IDE Drive, 1.4Mb, 8x CD ROM, resolution up to 1024 by 768, 16 bit colour up to 800 by 600, 28.8Kbps built in modem software included, 16 bit sound, stereo speakers, microphone, Video in and TV tuner, 2 * 7inch PCI slot, SCSI, 5.25 inch internal SCSI expansion bay, video in slot.

SOFTWARE - Mac OS 7.5.3, Avid Cinema, Adobe Photodeluxe, PowerGoo, Cubasis AV, Adobe PageMill, Dabbler, Best of European Soccer, Apple Telecom 3.0, Ultimate Human Body, Apple Video Player, Aladdin Activity Centre, Lion King Story Book, Acrobat Reader, Toy Story Preview, At Ease, Grolier MultiMedia Encyclopaedia, ClarisWorks4.0, Claris Impact, Claris Organiser, Internet Connection Kit, MacLink Plus, Full Throttle, HyperCard Player, Descent, Performa Clickart, Thinkin' Things 3, Sammy's Science House, PowerPete.



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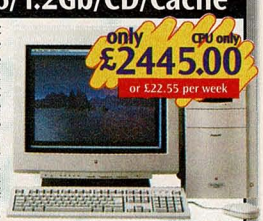

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Based around a Power PC 603e chip running at 100MHz, the 5260 combines the CPU and a 15" multiscan monitor supporting 32,000 colours. It has a built-in quad speed CD ROM drive, 12Mb of RAM as standard, and includes completely free ClarisWorks version 3.0.

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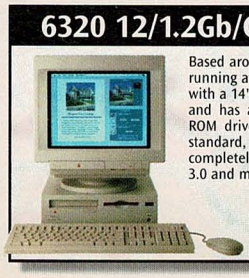
6320 12/1.2Gb/CD/Monitor



Based around a Power PC 603e chip running at 120MHz, the 6320 comes with a 14" or 15" multiscan monitor and has a built-in quad speed CD ROM drive. It has 8Mb of RAM as standard, 256k Cache, and includes completely free ClarisWorks version 3.0 and massive software bundle.

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L12A	**Colour LaserWriter 12/600 PS**	£3995.00

ACCESSORIES

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CD6A	**CD 600 external drive**	£225.00
ASPK	**AppleDesign Powered Speakers II**	£55.00
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LCEB	**Ethernet Card for 630 - 10BaseT**	£59.00
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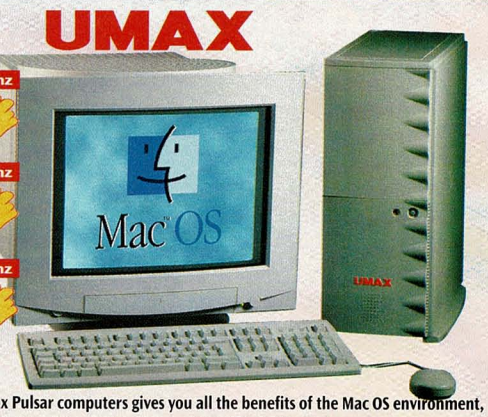

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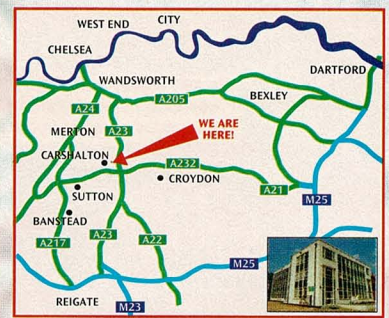

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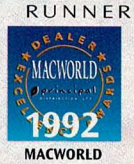

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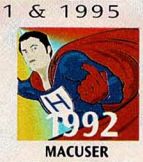

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Dynamic duotones

You don't need expensive image-manipulation software to jazz up boring old monochrome pictures. Read on, and discover the hidden graphic talents of *QuarkXPress*...

For all the wonderful things that electronic pre-press has brought the graphic designer, the art of the duotone is dying out. A duotone, as any print minder will tell you, is a monochrome continuous-tone image screened in two colours – usually black plus another – which hand-in-hand follow the tonal ranges across the entire image.

Originally used as a way of livening up dull black and white pictures, duotones offer the integration of a second hue which can actually give extra character and interest value to the subject matter.

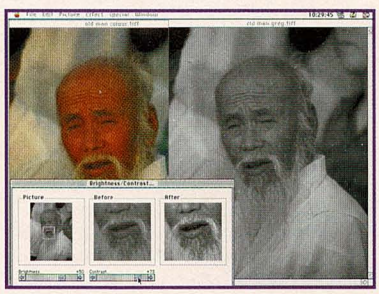
The reason that it's a dying art is not because of the proliferation of easy four-colour work, but because making duotones yourself in programs like *Photoshop* is actually damn difficult. Even when you think you've done it on-screen, *Photoshop* will probably have spread what appears to be two colours across all four process inks. This isn't much help if you want to output your picture on a two-unit press. However, a cheap and highly reliable method of creating genuine duotones has been sitting right inside *QuarkXPress* for years.

Fine artists might sneer at its lack of hands-on tonal control, but you can generate acceptable duotones that are 100% guaranteed to be in only two colours every time – and you can do it in less than five minutes. No, you don't need *XPress 4.0*, or *Photoshop* Plug-ins, or indeed *Photoshop*. Don't believe me? See for yourself.

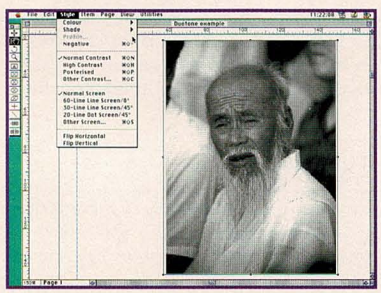
ALISTAIR DABBS

TIFF and PICT

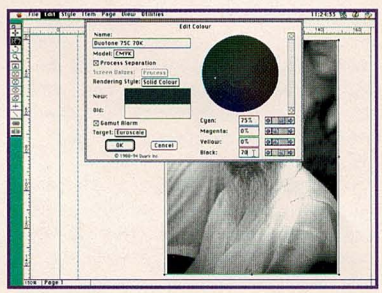
PICT and TIFF – Tagged Image File Format – are both common bitmap image file formats on the Mac. The advantage of TIFFs is that the colours are pre-separated, and the format is used widely across different applications and computer platforms, including UNIX servers.



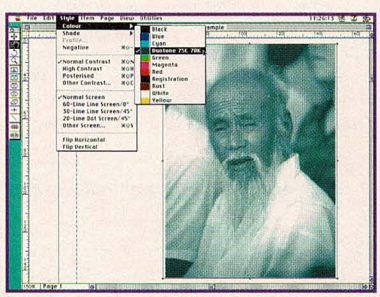
1 If your original scan is in colour, just convert it to a regular 256-level greyscale image. Any image-editor will do this: here we're using *GraphicConverter*. Then increase the **Brightness** and **Contrast** settings by a large margin, because duotones look best with lots of highlights to work on. This action is likely to dither the image, so make sure you reconvert the image to greyscale a second time if necessary. Finally, **Save** the image as a TIFF or a PICT – it doesn't really matter which.



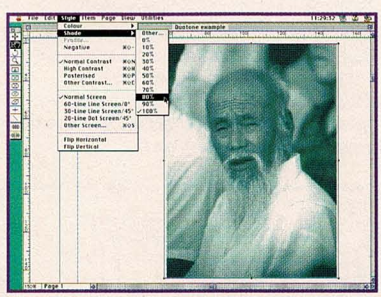
2 Launch *XPress* and **Open** the document you want the image in. Drag out a picture box as normal and select **Get Picture** from the **File** menu. Choose the greyscale image you created and click **Open** to import it. Type **[command] [option] [shift] F** to fit the image within the box frame and resize the box as necessary, holding down **[command] [option] [shift]** as you drag the handles. Notice how the **Style** menu looks when a greyscale TIFF or PICT is selected.



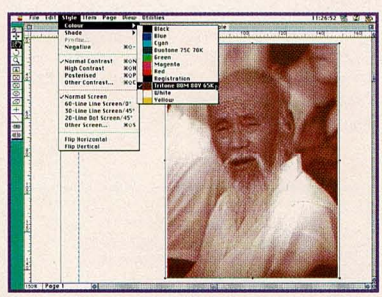
3 Choose **Colours** from the **Edit** menu and at the **Colours for filename** dialogue click on the **New** button. This opens up the colour editor. Define a mix of two inks with high saturation percentages for the duotone. Here we're using cyan and black from the normal process inks, so we need to select the CMYK model, switch **Process Separation** on, set the **Rendering Style** to **Solid**, then enter the colour values. Try 75% cyan, 70% black, name your new colour, click **OK** and then **Save**.



4 Now you can select the **Style** menu, Drag down one step to **Colour,** then choose the new colour you created from cyan and black. You've created an instant duotone made up of complementary black and cyan dots, and guaranteed to output uniquely onto two films. The duotone colour looks much paler than in the **Edit Colours** dialogue. You might wish to experiment with slightly heavier values, remembering that 100% black will obliterate the cyan completely.



5 The one drawback with this technique is that you cannot customise the way the duotone looks, except by changing the colour make-up, which affects the image from top to bottom. However, some other interesting effects can be produced by using a very dark colour mix and then knocking back the overall percentage of that colour's "shade" under **Colours** in the **Style** menu. You could also use this feature across several duotones to create a most impressive fade-out effect.



6 Why stop with a duotone? Here we've reopened the **Colours** dialogue under the **Edit** menu, and made up a new colour consisting of three colours: 80% magenta, 80% yellow and 65% black. Although it looks very dark in the menu, it produces a sepia effect when applied to the photo. You now have an instant tritone to match the duotone. Once you get the hang of defining the right colours, you may never want to run a dull old monochrome picture in your four-colour publication ever again.

Related to itself

In *FileMaker Pro 3*, you can created relational links between databases. But what if the data you want is elsewhere in the *same* database? Derek Smith shows you how to relate it to itself.

Over the past two issues, we've looked at how to relate databases together, and how to relate the same data across multiple databases. This time, we finish off our detailed look at *FileMaker Pro 3* relations by practising how to relate a single database back to itself. And, perhaps more importantly, we'll show you why you should want to do such a seemingly bizarre thing.

Let's take the example of a stock database – that is, a database that will log all the valuable items owned by a company. It will need to record certain data, such as a description of each item, when it was purchased, how much it cost and who currently has possession of that particular item.

It would be useful when looking at a certain item to not only see who owns that specific item, but also *who else* has one of those very same items. For instance, if you were looking at a record for a car, you might like to see details of anyone else in the company who also has a car.

Unlike the inter-related databases we've looked at over previous months, that data isn't held in a different file though. It's held in other records in the same database. Therefore, we'll need to relate the stock database back to itself.

It would also be useful when looking at an item owned by a particular person to see all the other items owned by that same person. For instance, if you were looking at a record for a computer owned by Joe Bloggs, it would be handy to see what monitor and other equipment he also has.

Shortcuts

Now that all of these related records are shown, it would be a great shortcut if you could instantly switch to any one of them. For instance, if you can see the ten filing cabinets that the company owns, it would be useful to instantly jump to any one of those records to see more details about it. You can achieve this by using a new command in *FileMaker Pro 3* called **Go To Related Record**.

If you've been practising all this new relationship stuff and you think you know how to do all it, then just hang on a minute. This company also wants to know a few facts and figures about its stock. For instance, when looking at an item, staff want to know how many of those items they have – for example, that they own 11 cars. It would also be useful to know the total value of all the items owned by an individual.

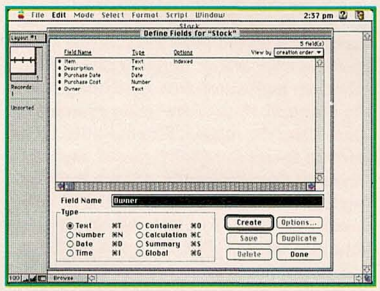
These types of calculations were only possible in summary layouts in *FileMaker Pro 2*, which were always fiddly at the best of times. We want to see the data live on every record. In *FileMaker Pro 3*, it's easy to do, by relating the database to itself in a **Calculation** field. Let's see...

Assumption

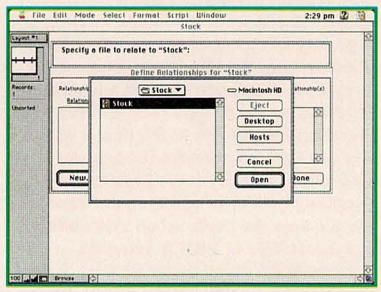
For the purposes of this tutorial, we're assuming that you know the basics of creating relations and portals. If not, best have a quick read of the last two issues of MACFORMAT first. If you missed those, turn to our back issues service on page 134.

Alternatively

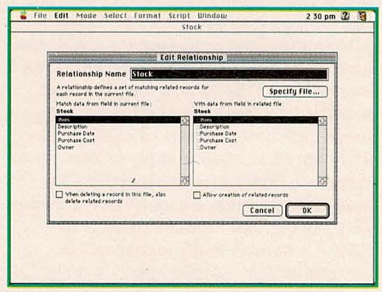
If you were designing a stock database for real, you could of course achieve similar results by different means, not necessarily self-relation. You would quite likely have a separate database of owners, and just relate it to the main stock database.



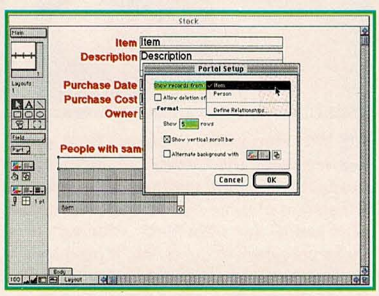
1 Start by creating a standard database with the following fields: **Item** (a text field), **Description** (text), **Purchase Date** (date), **Purchase Cost** (number) and **Owner** (text).



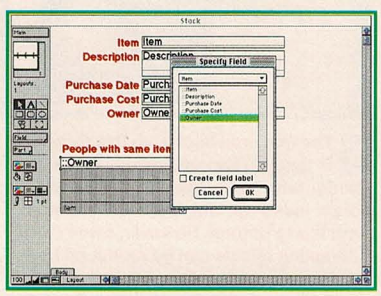
2 When you are looking at a certain item, you want to see other people with the same item. Select **Define Relationships** from the **File** menu, and click the **New** button. The file you want to relate to is the current one!



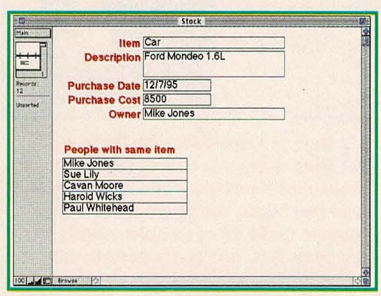
3 The field that you want to relate is **Item**, so you select the same **Item** field in both of the selection boxes. Rather than leaving the relation name as the default, it may help to call it, say, **Item**.



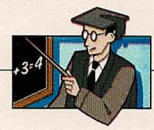
4 Now to create a portal to display the related data. Choose **Item** from the pop-up menu, so that it will display data in this portal from all records which have the same Item name.

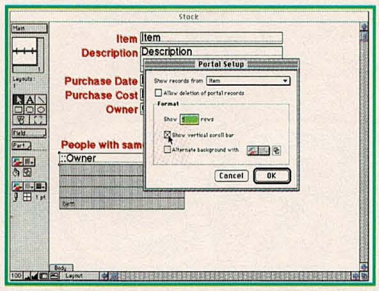


5 The field you want to place in the portal is **Owner**. However, it won't work if you take it from the current file. You must select Item from the pop-up menu and choose that **Owner** field.

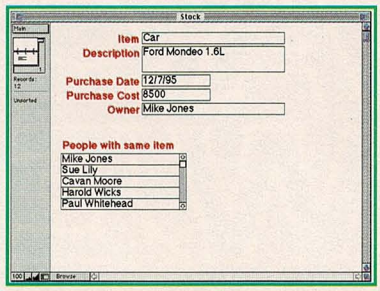


6 When you return to **Browse** mode, you'll now see in the portal the names of all the people in the same database who also own whatever the item happens to be on any record.

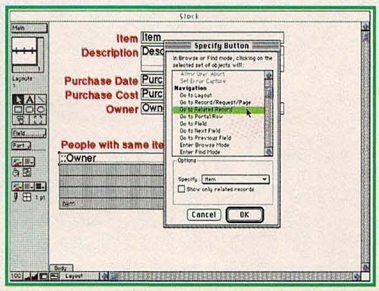




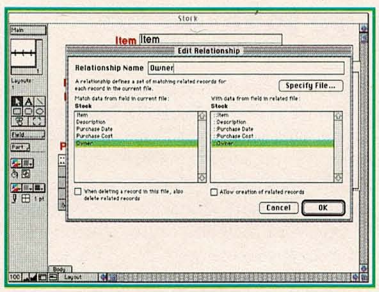
7 As your database grows, there will be more owners than portal rows. To get around this limitation, you can add a scroll bar to the portal. In **Layout** mode, double-click the portal and tick the **Vertical Scroll Bar** box.



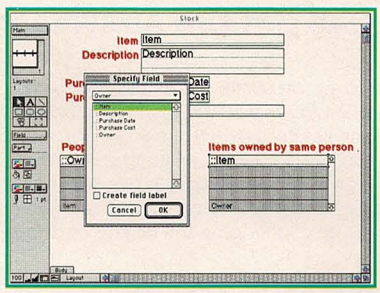
8 When looking at the list of people in the portal, it would be useful to be able to go immediately to the record linked to that name. In order to do this, we'll use the new **Go to Related Record** command.



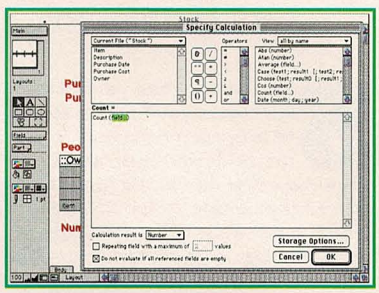
9 Back in **Layout** mode, select the **Field,** then choose **Button** from the **Format** menu. Next, select **Go to Related Record** from the list and choose the **Item** relationship from the pop-up menu. Then it's done.



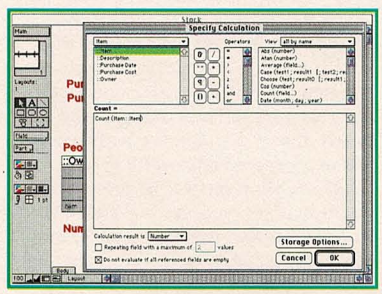
10 You can repeat the whole process to see all the items owned by the person you are currently looking at. Create a relationship called, say, **Owner,** and relate the **Owner** field to the same field in the same database.



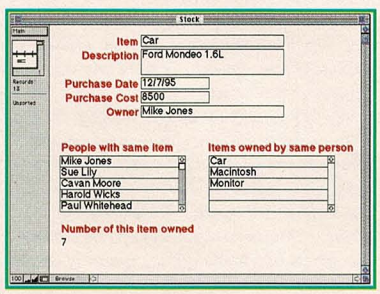
11 Create a portal showing the **Owner** relationship, and place the **Item** field from the **Owner** relationship in the portal. Add a scroll bar and then make the field into a **Go to Related Record** button.



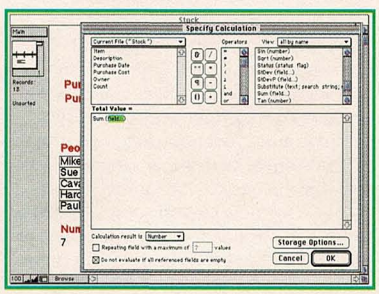
12 When looking at an item, we want to be able to calculate how many of that item we own. To do this, create a calculation field called, say, **Count.** Next, select **Count (field)** from the Functions at the top right.



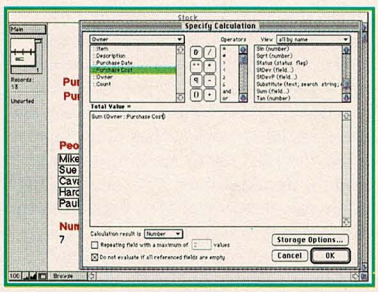
13 We want the field to count the number of items in the **Item** relationship. Choose the **Item** relationship from the pop-up menu in the top left corner, and then select the **Item** field.



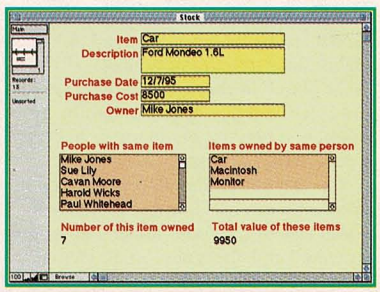
14 This will now count the number of records within the **Item** relationship, and thereby give you the total number of the items of whatever record you are currently viewing.



15 You use a similar technique for the total value of items for an individual. Start by creating a calculation field called, say, **Total Value.** Select **Sum (field)** from the Function list.



16 This time we want to choose the **Purchase Cost** field, but not from the current file. First choose **Owner** from the **Relationship** pop-up menu, then choose the **Purchase Cost** field.



17 No matter what record you're looking at, *FileMaker Pro 3* will calculate the sum of all the values in the **Owner** relationship, thereby giving you the total value of all items in the possession of an individual.

18 You've finished a clever and very functional database. From the articles in this and the last couple of issues of MACFORMAT, you should now feel confident using relations. Perhaps more importantly, you should also see how important they are.

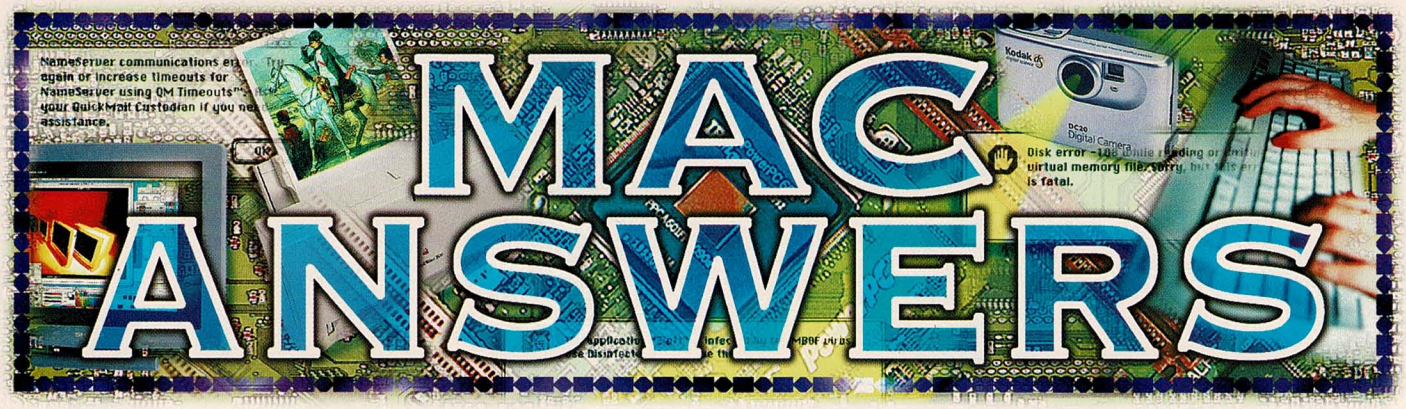
You'll notice that in this issue we not only used relations for displaying related data, we also used them in calculations. This enables us to calculate figures that were either impossible in an earlier version of *FileMaker Pro,* or at least were just cumbersome to arrive at.

Relations pervade the whole of *FileMaker Pro 3,* including data structures, calculations, finds and shortcuts. In future tutorials you'll see them cropping regularly in the most unexpected places!

Finished example database and *FMPro 3* demo.

We want you!

What sorts of *FileMaker Pro* how-to's do you want to see in MACFORMAT? Do you want us to cover basic topics, or tackle some of those really advanced problems? Let us know, or send us your questions, by writing to "FMPro", MACFORMAT, 30 Monmouth Street, Bath BA1 2BW.



Suffering from System problems? Trauma with your toolbars? Worried by your Wastebasket? Whatever your problem, our expert Lindsay Bruce has got the answer you're looking for.

Sometimes when your Mac isn't well, you have to resort to more conventional methods of doing things. Take the other day in the MACFORMAT office for example. The building which houses our numerous network and electronic mail servers had a power cut. Consequently, the network connections between some 400 computers throughout the company suddenly died, leaving the beleaguered MACFORMAT team stranded in a digital wilderness.

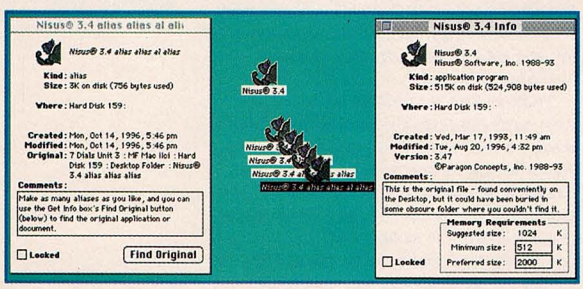
Bereft of this lifeline, we had to use our wits to solve the problem of inter-office messaging: the paper airplane! True, writing "Let's go to the pub!" on the side of a paper airplane and lobbing it at someone a mere 12 feet away might not seem an efficient use of resources, but hey, it got there quicker than e-mail!

The trouble with paper airplanes is they have a nasty habit of veering off-course. Our new system soon suffered a crash as a misdirected message sailed gracefully out of the window and hit an innocent bystander below. The somewhat irate tourist left bemused as our Art Editor leaned out of the window and shouted "Sorry, an error of type –157 occurred in the remote mail router".

If you have a problem with your Mac, fill in the coupon on page 65. Alternatively, you can e-mail us at **macformat@futurenet.co.uk** with "MacAnswers" in the subject title, or fax us on **01225 446019**, marking it for the attention of MACFORMAT. Sorry, but we can't answer technical queries over the phone or reply personally because now the telephone system is down and we've resorted to tin cans and lengths of string.

It's bombed

A "fatal" error is one which causes your Mac to hang or freeze or display the "bomb" message, because the Mac can't figure out what to do. When this happens, the only thing to do is restart. Sometimes the **Restart** button won't work and you'll have to do it manually...


Nisus® 3.4 alias alias al alia
Nisus® 3.4 alias alias al alias
Kind: alias
Size: 3K on disk (756 bytes used)
Where: Hard Disk 159:
Created: Mon, Oct 14, 1996, 5:46 pm
Modified: Mon, Oct 14, 1996, 5:46 pm
Original: 7 Dials Unit 3 :HF Mac IIci : Hard Disk 159 : Desktop Folder : Nisus® 3.4 alias alias alias
Comments:
Make as many aliases as you like, and you can use the Get Info box's Find Original button (below) to find the original application or document.
Locked
Find Original
Nisus® 3.4
Nisus® Info
Nisus® 3.4
Nisus® Software, Inc. 1988-93
Kind: application program
Size: 515K on disk (524,908 bytes used)
Where: Hard Disk 159:
Created: Wed, Mar 17, 1993, 11:49 am
Modified: Tue, Aug 20, 1996, 4:32 pm
Version: 3.47
©Paragon Concepts, Inc. 1988-93
Comments:
This is the original file - found conveniently on the Desktop, but it could have been buried in some obscure folder where you couldn't find it.
Memory Requirements
Suggested size: 1024 K
Minimum size: 512 K
Preferred size: 2000 K
Locked

You can make an alias of an alias if need be, and if you can't find the original you can do a Get Info (under File in the Finder or [command] I) on an alias, and click on the Find Original button.

Alphabetti spaghetti

Startup items

Q *(1) I want to put several aliases in my **Startup Items** folder so that I can load up the applications I need automatically. However, one of these is my mail program, which wants me to enter my password before doing anything else, so I want this to launch last. What determines the order in which the **Startup Items** launch? Is there any way that I can alter that order?*

*(2) Can I make an alias of an alias (so that I can add it to my **Startup Items** or **Apple Menu Items** folder without having to go to the trouble of finding the original)? How many times is it possible make aliases of aliases of aliases? Does doing this slow down the application launching significantly, or are there any other drawbacks?*

James Binns
Bath, Somerset

A (1) Any item in the **Startup Items** folder inside the **System Folder** is launched automatically as soon as your Mac has finished starting up. The **Shutdown Items** folder in System 7.5.1 or higher does something similar – any items placed in there are launched before the Mac shuts down. This is handy, for example if you use archiving or backup software that can run overnight.

You can put either aliases or the applications themselves in these folders – it doesn't matter. In both folders, items are launched alphabetically. So, to change the order in which they launch, simply change the name. Changing the name of an alias will not affect the original item. If you'd rather not change an item's name completely, you can put characters before its name to change its alphabetical order. For example, to get your e-mail program to launch last, put a bullet character (•) – **[option] 8** – in front of its name. This puts it last in the alphabetical order. To put something first, try typing a simple space before its name – spaces come before any alphanumeric character.

One very, very important warning though. If you use special or punctuation characters to change a file, alias, or folder's position in an alphabetical list, whatever you do, don't use a full stop. Your Mac uses a full stop **[.]**, otherwise known as a period, in front of invisible files that are used as drivers. Putting a full stop in front of a file could confuse your Mac into thinking this is a driver. Under no circumstances should you ever do this – it's inviting your Mac to trash your hard disk. If you're even slightly tempted to try it, don't. Trashed hard disks are very difficult to repair and nearly always result in the permanent loss of a large number of files!

(2) The short answer to your second question is yes, you can make an alias of an alias. An alias is simply a signpost to a file or application, it's therefore perfectly possible to make a signpost to a signpost. We tried it out in the office, and we made five linked aliases with no problem. We then tried 30 linked aliases and the Mac lost track of the original file – five would seem like a sensible limit. The Mac does slow down a little with each consecutive alias, but it's hardly noticeable. To be honest, making numerous consecutive aliases, although possible, is not something we'd call good working practice. The more aliases you make, the more chance your Mac has of losing track of which file or application they lead to. Besides, there is no need – just make two separate aliases, both from the original application. If you can't remember where the original is, simply highlight the alias in the Finder and select **Get Info** from the **File** menu (or use the key short-cut **[Command] I**). In the **Get Info** window is a **Find Original** button. This will open the folder containing the original item and highlight it. If you need to make lots of aliases (for

example, one on the Desktop, one in the **Apple Menu Items** folder and one in the **Startup Items** folder) it's better to make three separate aliases from the original than make an alias of an alias of an alias.

What's the floating point?

PowerMac processors

Q *Please could you explain what a floating point unit is, and does my Performa 5300 have one? I use* Photoshop 3.0 *and would like to use* Kai's Power Tools 3.0, *but some of the demo filters I have tried crash my Mac with an error saying "floating point unit not installed" or Error Type 11.*

Steve Bentley
Nuneaton, Warwickshire

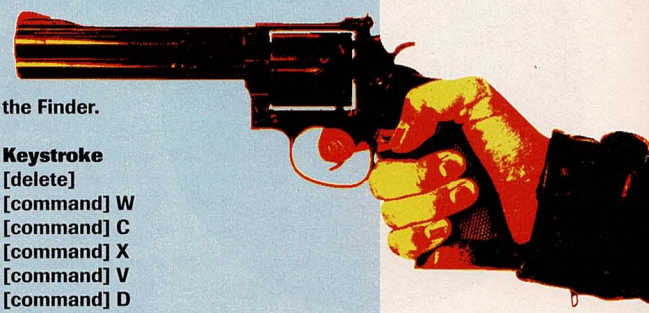
A A floating point unit (FPU for short), also known as a maths co-processor, is a chip that specialises in complex mathematical calculations. Its purpose is to speed up maths-intensive tasks on your Mac such as spreadsheets, 3D graphics, and many *Photoshop* functions. Macs based on the 68040 chip have an FPU built in, as do all the PowerPC chips (that's the 601, 603, 603e, 604 and 604e). That means all PowerMacs and Quadras have an FPU, and that includes your Performa 5300, which is based on a PowerPC 603 processor. For a more comprehensive list of which Macs have an FPU, turn to the Mac Facts table in our Buyer's Guide, starting page 113.

Although PowerMacs do have built-in FPUs, some older software designed to run on 68K-series Macs can't access it because the PowerMac runs 68K under emulation – it fools the software into thinking it's running on an ordinary Mac but, unfortunately, because of technical difficulties that couldn't be solved, the emulator can't simulate a 68K FPU. To solve the problem, simply get a hold of a PowerMac-native version of the application – a version that is designed specifically for the PowerPC processor – or try using the PowerMac version of *SoftwareFPU*, called *PowerFPU* (see the **Resources** folder on the Cover CD for details of how to obtain your copy).

Even then, though, there can still be problems. The Mac operating system is a vastly complex suite of software, and not all of it has yet been converted to PowerPC native code, so sometimes a program has to switch between native mode and 68K emulation on the fly. If it's in emulation mode and suddenly needs some FPU function, it may crash, usually with a Type 11 error. This is the most common fatal error on the PowerMac. Type 11 is a "hardware exception error" – in non-techie speak, your Mac was expecting something of its hardware that didn't happen. Result: instant crash. Most of these errors are now caused by bugs in the System software. Apple has made a huge attempt to purge as many of these as possible in recent upgrades. System 7.5.3 was on MacFormat 39's Cover CD, and the latest release, System 7.5.5, is due soon. As soon as a UK version of this is available, we'll put it on our Cover CD.

Troubleshooting keystrokes

This issue we take a quick glimpse at the most common keyboard shortcuts that save you having to drag your rodent all the way to the menu bar. These will work in nearly all applications, including the Finder.



Command	Keystroke	
Clear	[delete]	
Close File/Window	[command] W	
Copy	[command] C	
Cut	[command] X	
Paste	[command] V	
Duplicate	[command] D	
Find File/Keyword	[command] F	
Make alias	[command] M	System 7.5 only
New File/folder	[command] N	
Open file	[command] O	
Print file/window	[command] P	
Quit	[command] Q	Application only
Save file	[command] S	Application only
Select all	[command] A	
Undo	[command] Z	

Photographic memory?

Upgrading RAM

Q *I have an LC475 and want thousands of colours on my 14-inch monitor. I've heard that I need to install more Video RAM. What type of VRAM should I buy? I also have 8Mb of RAM installed. Can I expand this further on my machine?*

Evan Lewis
Brecon, Wales

A The LC475 comes with 512K of VRAM installed, which is enough to display 256 colours on a standard 640 x 480 screen. VRAM is used by your Mac to store images as they are sent to the monitor. The more VRAM your Mac has, the more detailed information it can hold. Hence more VRAM means more colours and higher screen resolutions. For more colours or a larger screen size, you need to plug in more VRAM. The 475 has two VRAM slots, one of which comes occupied by a 512K VRAM SIMM (Single In-line Memory Module). You can plug a second 512K SIMM into the second slot, which will give you a maximum of 1Mb of VRAM – more than enough to display thousands of colours on your monitor at 640 x 480. Alternatively, to display millions of colours on screen, or support a higher resolution monitor, you could buy a graphics card. Turn to our graphics card round-up starting on page 58 to find out more about how these cards work and which one is right for you.

Your Mac comes with 4Mb of RAM soldered to the motherboard. Another 4Mb SIMM is in the single slot on your motherboard. You can tell SIMM slots from VRAM slots as the former are generally longer. Your Mac will accommodate a maximum of 36Mb of RAM, but to expand it further, you'll have to ditch the 4Mb SIMM that's occupying the one slot. You can fit an 8Mb, 16Mb, or 32Mb SIMM into this slot instead. Prices of RAM fluctuate wildly, but it's still fairly cheap at the moment, so now is a good time to buy. Have a flick through the ads in MacFormat; you'll find that most mail-order companies sell RAM at

➤

Going soft

With *SoftwareFPU* (on our Cover CD inside the **Resources** folder), you can run FPU-intensive software on your 68K Mac, or most 68K software that needs an FPU on your PowerMac. It fools the software into thinking there's an FPU – though it will run more slowly.

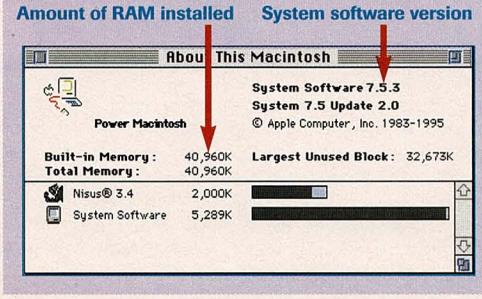
The do-it-yourself problem-solving guide...

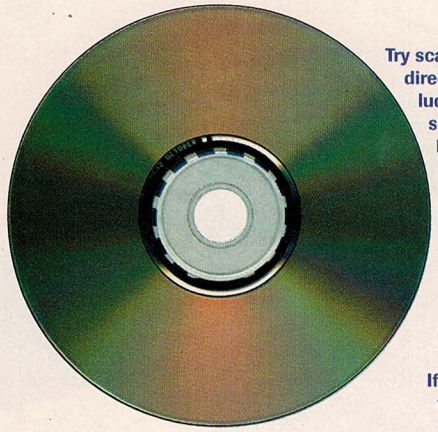
One of the most common causes of problems on your Mac is Extensions or Control Panels clashing in your System Folder. It's easy to check if this is the case. Restart your Mac and hold down the [shift] key. Release the key when you get the message, "Welcome to Macintosh. Extensions off." If everything now works, then the problem is likely to be an Extensions conflict.

The only way to work out which item is the culprit is by trial and error. Remove a few Extensions or Control Panels, then restart your Mac, without holding down [shift]. Keep on doing this until the problem no longer occurs and you've found the offending software.

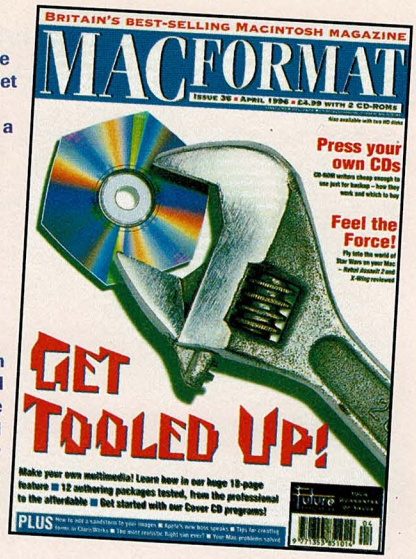
If this doesn't work, try rebuilding your Desktop. Start up holding down [command] and [option]. You'll get a message asking if you want to rebuild the Desktop. Click OK, wait for it to finish and see if this solves your problem.

If you're still stuck, use the form on page 55 to write to us. We'll need to know a few facts about your Mac, so when you're in the Finder, select About This Macintosh from the Apple Menu – the crucial things to note are shown at left.





Try scanning a CD directly and, if you're lucky, you might get something that looks like this – a horrible brown mess.



If you photograph the CD first, and then scan in the photograph, you'll get much better results. This is what we did for the cover of MACFORMAT 36.

SIMMple!

Fitting more memory is usually not all that difficult. In most Macs, it's simply a case of popping the lid off and fitting the chip into a spare slot. You'll also need an anti-static wrist-band. But check first whether opening up your Mac will invalidate your guarantee if you do it yourself.

competitive prices, but you'll need to fit it yourself. If you're not enthusiastic about this idea, you should get your local Apple dealer to fit the RAM for you.

Reflecting on CDs

Scanning

Q *If I were to scan a compact disc, would I damage the CD, the scanner, both, or neither? And would the resulting scan be distorted in any way?*

Kate Sullivan
Alveston, Bristol

A A rather specialised question, but how *do* you scan a reflective object? The answer to the first part is that it wouldn't damage either the CD or the scanner, but you might get some funny results. A flatbed scanner is designed to interpret reflected light bounced off the original document, whereas a CD is designed to reflect a laser beam. A CD is, by and large, a perfect mirror. Which means that it will reflect nearly all of the light the scanner passes over it. The result is that you won't get the rainbow effect that you see when you look at a CD – it's more likely to end up muddy brown.

To get the image into the Mac without this happening, you'll need to photograph a CD first, and then scan the results. Oddly enough, this is exactly the process we went through to produce the cover image of MACFORMAT 36.

The young (and slow) ones

PowerMacs versus PCs

Q *I live in a student house with four PC users who are each convinced that their platform is better and faster. I have a PowerMac 6100/60 with 24Mb of RAM, a CD-ROM drive, 28,000bps modem, laser printer and SyQuest EZ135 drive. All this equipment cost a lot of money and still* Microsoft Word *takes longer to open than it does on a 486 DX2-80, which was cheaper at the time of purchase than my Mac was. How can this be?*

I had come to peace with the fact that I had to go to one of my neighbours to play F1 Grand Prix, *or* FIFA '96. *The release of* IndyCar Racing II *and* Actua Soccer *may be good news for people buying Macs now, but what about those faithful Mac owners who bought the PowerMac when it came in just three models? I just can't believe that games like* Actua Soccer *can't be programmed to work smoothly on early "sub-100MHz" PowerMacs. PC users have been playing soccer and car-racing games smoothly since the 386 with 4Mb – a 60MHz PowerMac with 24Mb should be able to handle that!*

Dennis Huurdeman
Via e-mail

A Your 6100 was one of the first PowerMacs ever, and technology has advanced over the last couple of years, so that almost all of the more recent models are signifcantly faster still (with the possible exception of some PowerPC-based Performas such as the 5300). Nevertheless, your 6100 will whip a 486 PC's backside any day. Ask your chums to try running graphics, sound or video applications on their machines – trust us, your PowerMac will blow them out of the water. On the hardware side of things, the PowerPC 601 chip in your PowerMac makes a 486 chip look like a tortoise on crutches. Your PowerMac also has superior graphics display, capable of 32,768 colours on a standard 640 x 480 screen while most PCs can only muster a poor 256. This is not to mention built-in Ethernet, 16-bit digital sound and an operating system that is still far and away the easiest and quickest to use. So where does it all fall down?

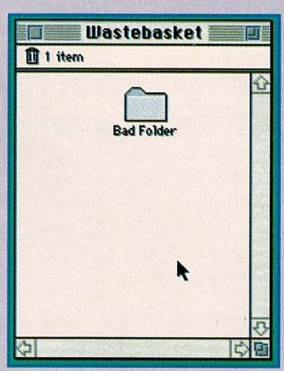
Well the reason that *Word* is slow to open is that most applications written specifically for the Mac are tied very closely to the Operating System and hardware of your computer. At the heart of the Mac OS is the Toolbox – a collection of routines and computer code

Waste and corruption

This issue's tip comes from Donna Miller in New Zealand, who has a solution for Jeremy Firth's corrupted files in the Wastebasket (MacAnswers, MACFORMAT 40). Jeremy couldn't delete a folder and file in the Wastebasket because they were corrupted, and trying the Empty Wastebasket command just gave a cryptic error message. Here's Donna's solution:

Create a new folder on the Desktop and give it the same name as your troublesome corrupted folder. Drag the empty folder to the Wastebasket. Your Mac will ask you if you want to replace the older folder. Click OK. If you have the same problems with a file, use the same technique but using a *SimpleText* file instead of a folder.

We haven't been able to try this out because we haven't managed to duplicate Jeremy's problem, but in theory it might work. Normally when you drag an item to the Wastebasket and there's something already in there with the same name, your Mac will simply rename the first one. However, if it can't find or change the name of the corrupted file, then it might just forget it exists and overwrite it with the new file.



Got a corrupted folder or file you can't delete? Try dragging a folder (or file) with the same name to the Wastebasket.

Usually, your Mac will rename the first folder, but if it can't find it because it's corrupted, it might just overwrite it, enabling you to delete it.

A handy tip if we ever heard one, but just to make sure you should also then run *Disk First Aid* (Apple's disk repair utility, supplied with all new Macs) over your hard disk to check it out for any additional problems.

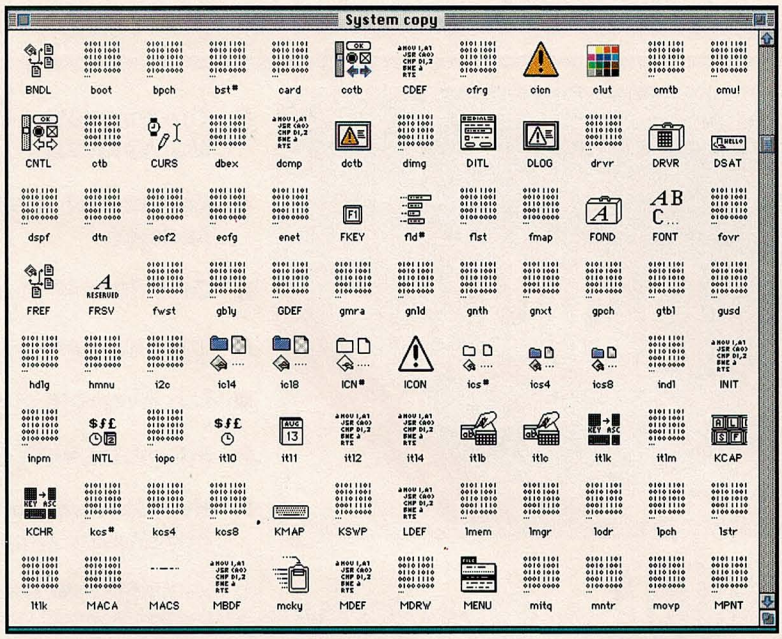
Well done, Donna, there's a bundle of MACFORMAT goodies en route to you! If you find any tips, tricks or just weird features on your Mac, send 'em in to MacAnswers, MACFORMAT, 30 Monmouth Street, Bath BA1 2BW.

ready-made for developers. Want to draw a window on screen? A couple of instructions in your program will get the Mac to do it for you without you having to write several hundred lines of code yourself. Most of the features of your Mac can be accessed by a program in this way, and most developers use the Toolbox to full advantage. It makes programs smaller, more compatible, and generally faster, since most of the Toolbox is already loaded into your Mac's memory.

The one common exception to this is anything written by Microsoft. For some reason (possibly because Microsoft applications tend to be written for Microsoft's own Windows system first), Microsoft doesn't use any of the Mac's built-in routines. Instead, it prefers to write its own. This seems to be why it takes vast amounts of disk space and RAM to run a Microsoft application – but it *still* runs slowly because your Mac has a huge wad of extra code to process. This is why *Word* is slower to open and run on your PowerMac than it is on a PC.

On the games side of things, many developers are guilty of cutting corners when it comes to producing Mac versions of their software. They usually convert PC code into Mac code without bothering to optimise it for the Mac. For example, *Doom* tends to run slower on a PowerMac than it does on the average PC. However, *Marathon* – which uses more colours and sounds than *Doom* – runs way faster because it was written specifically for the Mac. And we consider *Doom* to be one of the better-ported titles – we've come across a lot of games ported to the Mac that require stupid amounts of RAM and processing power to handle relatively simple graphics and sound.

To be completely fair, porting a game to the Mac from another platform is extremely difficult. It's simply not possible to rewrite the entire program – that could take months. Most developers simply adapt the code that they've already developed, instead of writing new Mac-specific code. The result is that many ported Mac games run slower and are limited to 256 colours – a pretty poor showing on the Mac. **MF**



This is the resource fork of a copy of the System File, as seen in *ResEdit*. Resources are used mainly to access the Toolbox – a vast collection of software tools and routines available to the developer. Unfortunately, not every programmer uses them...

Power hertz

The clock speed of a processor (measured in megahertz or "MHz") is simply the speed at which it runs. This alone is not enough to judge the Mac's power – a 200MHz 604e, for example, is between 30% and 50% faster than a 200MHz 603e because the 604e chip is inherently more powerful.

Ask the experts...

If you send in a question for the MACFORMAT experts to solve, please fill in and include this form (or a copy of it). And please make sure that you include all the relevant details – version numbers of software and so on – so that we have the best chance of helping you. Send your form and question to:
MacAnswers, MACFORMAT, 30 Monmouth Street, Bath BA1 2BW; or fax it to us on 01225 446019.

Name .....

Address .....

.....

.....

.....

.....

Your Mac
(For example, Performa 200, IIfx, PowerBook 145):

.....

System version
(see **About This Macintosh** screenshot on page 67): .....

Amount of RAM
(see **About This Macintosh** screenshot on page 67): .....

Are you using Virtual Memory? ..... **YES/NO**
(This is accessed from the Memory Control Panel under System 7)

Do you have 32-bit addressing turned on? ..... **YES/NO**
(This is accessed from the Memory Control Panel under System 7)

Details of any relevant hardware which could help us to answer your question:

.....

.....

Now, use this space to describe your problem or question. Please include as much relevant information as possible, and continue on a separate sheet if necessary.

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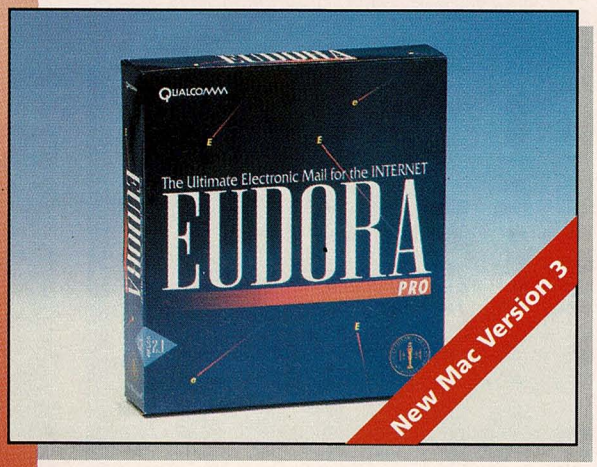

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Reviews

In-depth, authoritative tests of products from graphics cards to multimedia and games.

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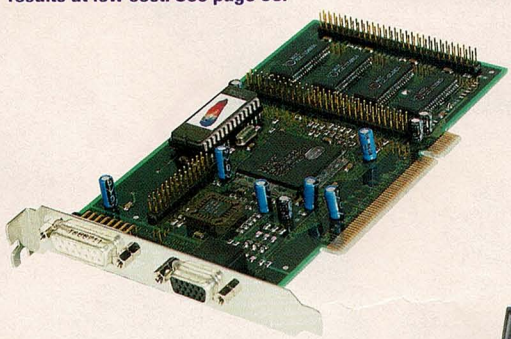
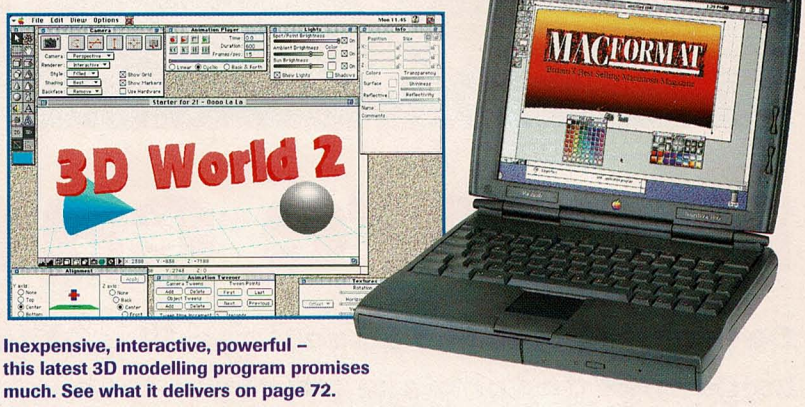
The ALPS MD-2010 printer uses a Micro Dry™ printing system, producing top quality results at low cost. See page 68.

Your task: to kill the enemy. Your troops: a team of killer worms... Discover this new, fun game on page 102.



Faster, brighter, bigger – graphics cards can do all this for your screen display. Find out which would suit you on page 58.

Apple's eagerly-awaited new PowerBook range, the 1400 series, is here at last. We put them to the test on page 66.



Inexpensive, interactive, powerful – this latest 3D modelling program promises much. See what it delivers on page 72.

Reviews you can trust

Every MACFORMAT review is designed to inform you in detail of what you'd be getting if you bought the product being reviewed, and help you decide whether it's worth your money. It tells you the essentials, without the jargon.

MACFORMAT never just reprints spec sheets, press releases or reports from overseas magazines. Every product reviewed has actually been tested by our own reviewers.

MACFORMAT has a cast-iron policy of editorial independence. We are not influenced by whether the supplier or manufacturer of a product advertises in the magazine. They find out the rating at the same time you do, when the magazine is published.

MACFORMAT *does not review demos or unfinished programs.* We review only the finished products you could buy yourself, to help you decide whether to buy or not.

MACFORMAT Classic

We give clear buying recommendations, and rate products using the following scale:

- If a product earns a rating of 90% or more, it wins a MACFORMAT Classic Award. This means we judge it to be a benchmark, a standard-setter of its type.
- 80+% means excellent.
- 70+% means well worthwhile or great value, though not particularly outstanding.
- 60+% means good, but with a few shortcomings or some limitations.
- 50+% means acceptable but flawed or seriously limited.
- A rating below 50% means think carefully before parting with your money (but we do distinguish between a product that's "almost there" and one that's a waste of time).

ON THE CD

This means there's a demo version, preview or sample on our Cover CD

The MACFORMAT info bar

PRICE	£40	**ON SALE**	Now	**CONTACT**	Future on 01225 442244	**WEB SITE**	http://www.futurenet.co.uk/
MAC	**Processor:** 68030 • **RAM:** 8Mb	**POWERMAC**	**Processor:** 603 • **RAM:** 8Mb	**REQUIRES**	**System:** 7.5 • **HD space:** 5Mb • **Screen:** 640 x 480 • **Colours:** 256		

Price: RRP, inc VAT. **Contact:** The number to call for more information. **Web site:** Usually the maker's site, for more details. **RAM:** The minimum memory your Mac will need to have. Free RAM is the requirement excluding the System. **Processor:** Check the table on page 116 for your Mac.

Picture cards

Do you want to speed up your scrolling? Display more colours? Gain a bigger Desktop or make your work look bigger on screen? You need a graphics card – but which one? Lindsay Bruce looks at your options.

Your monitor is the second most important part of your computer setup after the Mac itself. You might even argue that it's the first – the monitor is, after all, what you stare at day after day. Behind the scenes, though, there's a myriad of complex technology that works tirelessly to bring the images to your Mac's screen. Sometimes, you'll make heavy demands of this technology and it will be unable to keep up.

Today's Macs come with built-in graphics hardware capable of displaying thousands of colours on a standard 14-inch screen. If you're a professional artist or Mac guru, though, you may want to use a 17-inch or bigger monitor, and be able to display millions of colours on screen. Sadly, this is beyond the capability of many Macs as they come out of the box. You need help.

House of cards

There is a solution – a graphics card. All Macs since the Plus have had an expansion slot of one sort or another, and you can use this slot to plug in an extra card that's dedicated to driving a high-resolution monitor. The benefits can be enormous – you can display very high resolutions on any monitor that supports them, in up to millions of colours. Because graphics cards have their own microprocessor, the display is usually much faster than your Mac could ever manage on its own.

Who needs one? Well, anyone who wants or needs a larger monitor or a greater range of colours on-screen. If you use your Mac professionally (for graphics, for design or for DTP) this includes you. Otherwise, a graphics card is still a handy thing to have, but not essential.

What's in it for me?

A larger monitor gives you more Desktop real estate. In the same way that a 21-inch television has a larger viewing area than a 14-inch portable, so does a larger monitor. However, unlike a television, a larger monitor can also pack more detail

on screen – that is, they're said to support greater resolutions. (See the "Colour and resolution" box.) What's more, most 15-inch or bigger monitors these days are multiple-sync, meaning they support a wide range of resolutions and you can swap between them at any time without having to restart your Mac.

However, chances are that your Mac won't be able to drive the monitor directly at these higher resolutions because it does not have enough Video RAM – a special area of memory reserved for mapping the position and colour of every single pixel you see on screen. Larger monitors mean higher resolutions and more pixels to map, so your Mac probably won't be able to cope. Solution? Add a graphics card to take the load.

What is a graphics card?

A graphics card plugs into one of the expansion slots inside your Mac. In older Macs, this could be a PDS or NuBus slot, while the latest PowerMacs use PCI slots. You plug your monitor into the other end of the card and it takes over control of the display from your Mac.

This of course leaves you with the standard monitor connection on the back of your Mac free, and you can, if you wish, connect a second monitor to this. A second monitor will work alongside your main monitor, and when you drag your cursor to the edge of the screen it will appear on the second monitor.

It's also worth noting now that many people (especially in America) refer to graphics cards as video cards. This causes a certain amount of confusion with video *digitising* cards. They're not what we're concerned with here (but see page 30).

How do they work?

Graphics cards have their own processor, dedicated to converting data from your Mac into an image stored in VRAM, which is then displayed on screen. Your Mac passes information to the card using QuickDraw – the Mac's native display and imaging software. In a nutshell, it identifies each picture element (pixel) on screen by its coordinates and specifies its colour according to the palette available. Clearly, if you have a display of 1,024 x 768 = 786,432 pixels, each of which can be any of 16.7 million colours, that's a lot of data to process!

The on board processor dedicated to handling graphics comes in two flavours: 64-bit or 128-bit. 64-bit processors handle 64 bits of information per clock cycle (that is, each time the processor sends out a "spurt" of data), 128-bit processors can handle twice as much. It follows that 128-bit processors are faster, but they are also more expensive.

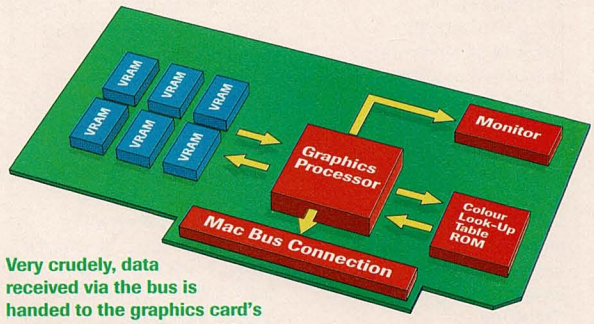
What to look for...

The key things to look for when buying a graphics card are fairly straightforward. The first thing to check is the resolutions it supports, and how many colours it can display in each of these resolutions. Some cards have fantastically high resolutions, but remember that these are useless unless your monitor is physically capable of supporting them. The next thing is to check that the card is the right type for your Mac – older Macs have NuBus connectors, new ones PCI.

Then, watch for any additional features – extras that make the card easier or faster to use, or even add to your productivity. Some to look out for are:

- **Auto-sense.** This enables the card to interrogate your monitor when first connected to find out which resolutions it can support. It will then switch to one of these. Only these resolutions will then be displayed as options in the **Monitors** Control Panel. Nearly all cards have this feature, and we've only noted it where it's absent.
- **QuickDraw acceleration**. This feature speeds up the Mac's built-in graphics capability. It's done in two ways: using ➤

How they work

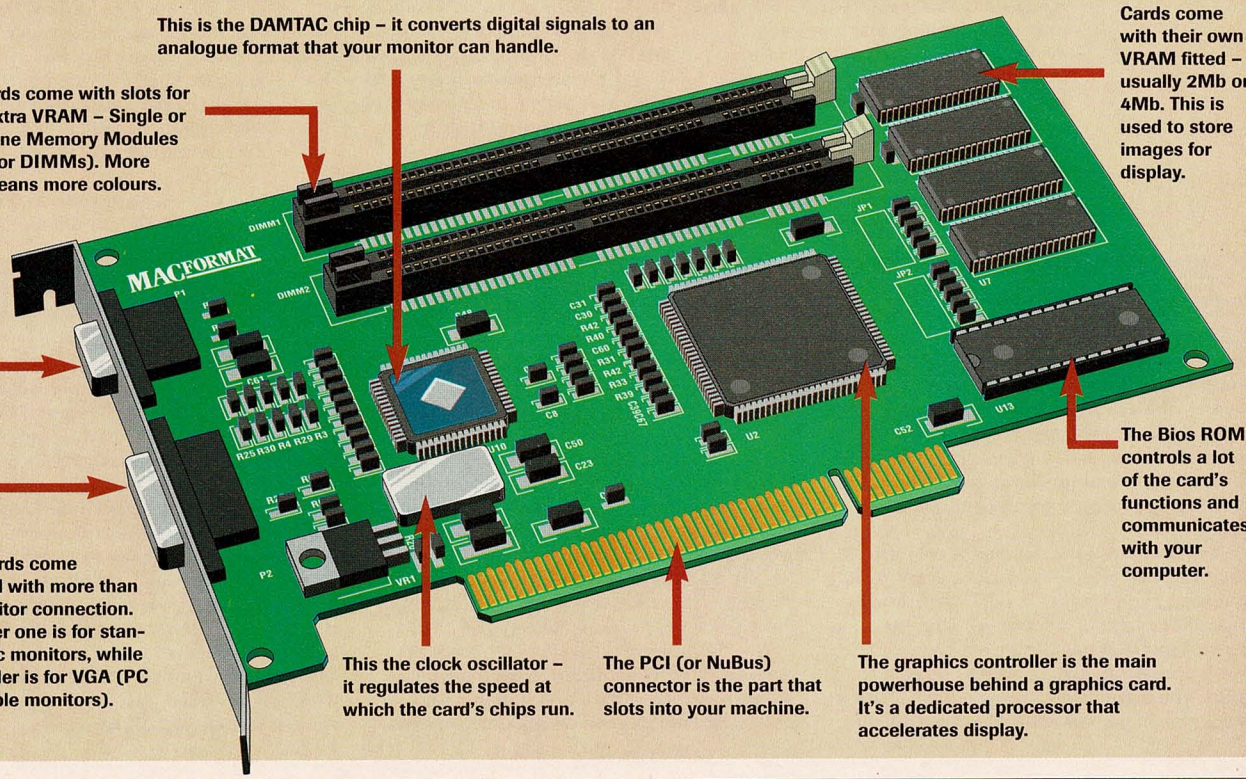


Very crudely, data received via the bus is handed to the graphics card's processor, which stores it in dedicated VRAM, where it builds up a full display for output to a monitor. It may also call on a colour look-up table chip, which stores colour codes ready for faster access.

Monitors

Choosing the right monitor is as vital as choosing the card to drive it – see our Buyer's Guide (page 114) for advice on what to look for. Graphics cards often have VGA (PC compatible) ports as well as Mac ports, so fitting one makes your choice of monitor even wider.

So what do all the different bits do then?


This is the DAMTAC chip – it converts digital signals to an analogue format that your monitor can handle.
Many cards come with slots for adding extra VRAM – Single or Dual In-line Memory Modules (SIMMs or DIMMs). More VRAM means more colours.
Cards come with their own VRAM fitted – usually 2Mb or 4Mb. This is used to store images for display.
The Bios ROM controls a lot of the card's functions and communicates with your computer.
Some cards come equipped with more than one monitor connection. The larger one is for standard Mac monitors, while the smaller is for VGA (PC compatible monitors).
This the clock oscillator – it regulates the speed at which the card's chips run.
The PCI (or NuBus) connector is the part that slots into your machine.
The graphics controller is the main powerhouse behind a graphics card. It's a dedicated processor that accelerates display.

Jargon busters

■ **G-World** (Graphics World)
An area of off-screen memory that mimics VRAM. Most programs – most notably graphics programs and all games – use this to prepare images before transferring them to VRAM. This is faster and smoother than drawing each component of the image directly in VRAM.

■ **NuBus**
A connection standard, much the same as PCI but slower and found in all Macs since the Mac II (including pre-PCI PowerMacs, Quadras, Centris series Macs and some LCs and Perfomas).

■ **PCI** (Peripheral Component Interconnect)
An expansion bus architecture found in newer PowerMacs (7200, 7500, 7600, 8500, and 9500 series) that enables you to add new or enhanced features to your Mac.

■ **Resolution**
The number of pixels that can be displayed on screen, expressed as the horizontal number followed by the vertical (640 x 480 for example).

■ **SVGA** (Super Video Graphics Array)
This is a revised version of VGA. These days all VGA monitors, graphics cards and cable are actually SVGA, but many people still refer to them by the old name. Tradition, I guess.

■ **VRAM** (Video Random Access Memory)
A special type of high-speed memory used for storing images as they are sent to your monitor for display. The more VRAM you have, the higher resolutions and the more colours you can display on your screen.

■ **VGA** (Video Graphics Array)
A common monitor connection type found mostly on PC-compatible computers. Although the Mac uses a different connector, it can use VGA monitors (which are usually cheaper) via an adaptor or a VGA port on a graphics card.

the card's on-board graphics processor and using the driver software, which offers some shortcuts (not all of which are compatible with all software).

■ **Gamma correction.** This feature compensates for the differences between individual monitors and provides a degree of colour correction. This correction brings your monitor's display closer to the actual RGB values that are output by your Mac.

■ **Hardware zoom.** This enables you to zoom in on a portion of the screen, and – because it's built into the hardware rather than part of the driver software – it's very fast. You can use this to scroll around the Desktop by simply dragging your mouse to the edge of the screen.

■ **Virtual Desktop.** This enables you to move beyond the edge of the screen, as it were, making your Desktop just like any document window – up to as much as 2,500 x 2,000 pixels in size. It's not recommended that you use this in conjunction with hardware zoom!

■ **Window drag.** This is a feature of the Formac series of cards and enables you to drag whole windows around – instead of just an outline – so that the contents are always visible.

■ **Enlarged cursor.** Another Formac feature that (not surprisingly) makes your mouse cursor much bigger – a handy feature if you use your Mac for giving presentations.

■ **Font cache.** An area of memory used to store font data, enabling it to be retrieved quickly by the card. This substantially increases the speed at which text is drawn on screen.

■ **Screen saver.** Some cards have a built-in screen saver feature that dims your monitor after a preset period of inactivity. This extends the life of your monitor and prevents the age-old problem of "burn-in" where ghosts of frequently-displayed bright images stay visible on screen, even when the monitor is turned off.

Any alternatives?

If you can't afford a graphics card or your Mac doesn't have a free expansion slot, you may still be able to upgrade your machine to make it capable of driving a larger monitor. Most Macs have a certain amount of VRAM built-in on the motherboard. You can expand this VRAM by buying special SIMMs (or DIMMs in the case of PCI PowerMacs). Note that these are different from RAM SIMMs and DIMMs. All you need to do is buy the appropriate memory module for your Mac, plug it in, and hey presto, you have more colours on screen!

Macs that can be expanded include all PCI PowerMacs (but not non-PCI PowerMacs) and their clones, Quadras (excluding the 660AV), all 68K-based LCs and the Mac IIvx and IIvi. You should note that most Performas, like the 630 and including the PCI Performas – the 5400 and 6400 series – can't have their VRAM expanded, so you'll need to buy a suitable graphics card. If you're any doubt about your Mac's VRAM expansion capabilities, check your manual and then talk with your local Apple dealer.

Buying more VRAM is cheaper than buying a graphics card. VRAM is around £20 for 512K, while a graphics card will cost you £150 upwards. On the other hand, a graphics card is faster and enables you to display higher resolutions. So how do you choose the one for you?

About our reviews

All but one of the cards we're reviewing are PCI (Peripheral Component Interconnect)-based, designed to be used in the newer PCI PowerMacs. You should still be able to find NuBus-based cards available for older Macs.

To test the cards, we fitted them in a Umax Pulsar 604e/200 Mac compatible and used *MacBench* to test each card's graphics display speed at a resolution of 1,024 x 768 in thousands of colours. We also used two scrolling tests to give a real world indication of each card's speed – a 30,000 word *Nisus* document and a 1,024 x 10,000 pixel *Photoshop* file.

The Pulsar is a more powerful machine than most users will have, but we used it for three reasons. First, most of the graphics cards are so fast that to test them on a slower machine would cause a bottleneck at the *Mac's* end, giving misleading results. Second, it enabled us to test the cards' compatibility with clones. And finally, like the PowerMac 9500, the Umax Pulsar doesn't have its own monitor port, but rather comes with a graphics card (an IMS Twin Turbo). This means that *all* graphics performance is down to the card, not the Mac processor. For our tests, we fitted each card into one of the five other PCI slots and connected the Apple 17-inch monitor to *it*. (A graphics card only accelerates the monitor it's connected to – if you fit a second card, you won't see any difference in the speed of the first.) So how did they perform?

Colour and resolution

Your monitor screen is made up of small "picture elements" (pixels for short). One pixel is the smallest dot your monitor can display on screen. The average monitor packs around 72 pixels into one inch, and the standard 14-inch monitor measures 640 pixels across and 480 down. Larger monitors have more pixels, so can display at higher resolutions, such as 1,024 x 768.

Colour depth is the number of colours that your Mac can display on screen. Theoretically speaking, your monitor is cable of displaying an infinite range of colours, but your Mac has a problem doing this because it has to map every pixel on screen, as well as its colour value. The more colours and the higher the resolution of your monitor, the more memory your Mac requires to map the screen.

To define colours, your Mac splits the spectrum up into small chunks, producing a range of individual colours. This requires your Mac to "remember" the red, green and blue values it needs to produce specific colours on screen. You get a choice of colour depth – that is, how many colours you'd like your Mac to display. Typically, this will be black-and-white (1-bit), 16 colours (4-bit), 256 colours (8-bit), 32,768 colours (16-bit – the "thousands" option in your Monitors Control Panel), and 16.7 million colours (24-bit).

The "bit" number describes the amount of memory required to describe each colour in these modes (and it's worth noting at this point that the PCI PowerMacs don't support anything less than 256 colours).

The principle is simple once you grasp it. Imagine that you wanted to find out exactly how far you live from the centre of London. You have several options: you could measure the distance in kilometres (miles could be an option if you prefer!), metres, centimetres, or – for ultra accuracy – millimetres. The more precise you get, the more information you have to deal with. It's the same with colours on your Mac. The more detail you want displayed on screen, the more information it has to process. So, to display millions of colours on a 640 x 480 screen, the Mac uses 24 bits of information for every pixel. That's 24 x 640 x 480, or 7,372,800 bits – or 900K of data. No wonder screens update so slowly!

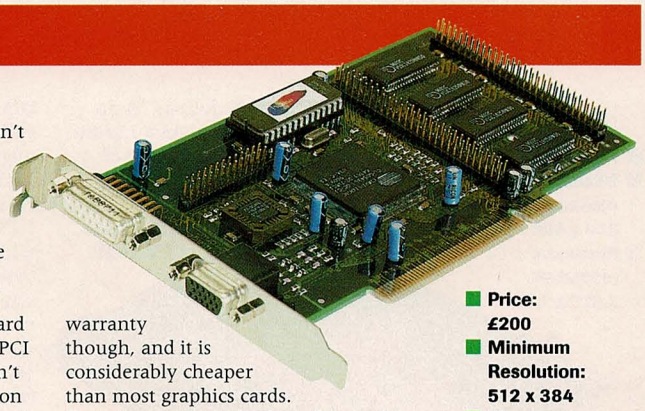
MacPicasso 520

Village Tronic's MacPicasso card is based on a 64-bit graphics processor. Capable of displaying millions of colours up to 832 x 624, thousands of colours up to 1,152 x 870, and 256 up to 1,600 x 1,200, the MacPicasso does not support auto-sense. It simply gives you the option to choose from any resolution the card itself supports. This is a blessing and a curse – occasionally auto-sense is wrong and the higher resolutions may not be available to you. However, having all of the options available doesn't mean your monitor will work with all of them.

The driver consists of a single Control Panel with a QuickDraw acceleration option. An **Expert** function enables you to turn off individual acceleration types (such as text acceleration). Should this clash with other software on your Mac, you simply turn off the acceleration technique at fault. This means you don't forego acceleration in other areas – neat.

The documentation is thin and brief. It covers fitting the card (but with no diagrams) and how to use the Control Panel. There's no troubleshooting, no tips and no list of recommended monitors. Fitting the card was also difficult. We tried it in three PCI slots before it would work, and couldn't get it to display more than 832 x 624 on an Apple 17-inch monitor. To its credit, it worked perfectly with our MAG 17-inch VGA monitor.

In our real world tests, the MacPicasso was the slowest of all the cards. The *Nisus* scroll took over 47 seconds, and the *Photoshop* file 31 seconds – hardly speedy. It gains points for having a two year warranty though, and it is considerably cheaper than most graphics cards. If you're on a tight budget, this card offers high-res colour for little outlay; if you're a professional you'll want something a bit faster.



- **Price: £200**
- **Minimum Resolution: 512 x 384**
- **Maximum Resolution: 1,600 x 1,200**

MacPicasso 520

MF rating 75%

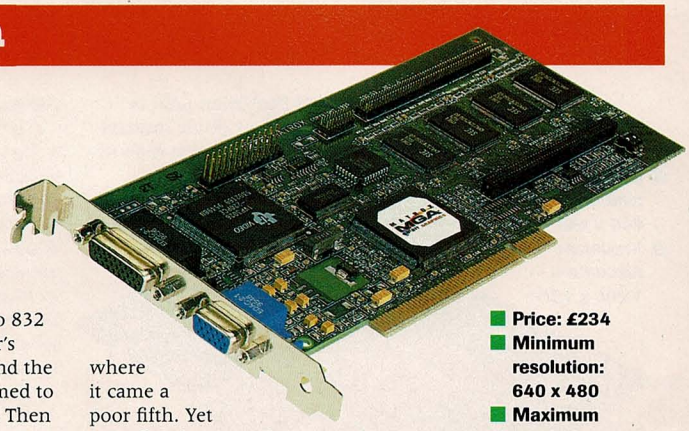
Matrox MGA Millennium

High resolution and QuickDraw 3D acceleration for under £250? True, but there's a catch – no Mac monitor port, so you need an extra £20 for an adaptor. The Millennium has a VGA port and what looks to be a Mac port, but it has an extra row of pins on the connector. Matrox says this is for a video input adaptor that will be made available in the UK at a later date.

The Millennium's features are impressive. It supports millions of colours up to 1,440 x 1,080, thousands of colours right up to 1,600 x 1,200 and accelerates QuickDraw 3D for real-time rendering of 3D models, though at present it doesn't support texture-mapping. The driver software consists of three Extensions and a Control Panel with which you can set up hot keys for hardware zoom (up to four times screen size) and the Virtual Desktop option, although not for resolution switching.

The documentation is very good. It covers fitting, installing the driver software and troubleshooting. However, getting the thing to work in our Umax Pulsar was difficult – it often froze on startup. It worked fine in our PowerMac 7200, though only up to 832 x 624. Eventually, fitting the Pulsar's own graphics card in the top slot and the Millennium in the bottom slot seemed to work, but only in 832 x 624 mode. Then we used the driver disk provided to update the card's ROM and it then worked fine, but only in the bottom slot. Weird.

It got through the text scroll in 19.49 seconds and the *Photoshop* file in 9.15 seconds, making it the fastest on test. The benchmark tests were far less impressive, where it came a poor fifth. Yet overall, it has great features, a three year warranty, and costs far less than cards that give similar performance.



- **Price: £234**
- **Minimum resolution: 640 x 480**
- **Maximum resolution: 1,600 x 1,200**

MGA Millennium

MF rating 88%

ATI Xclaim GA

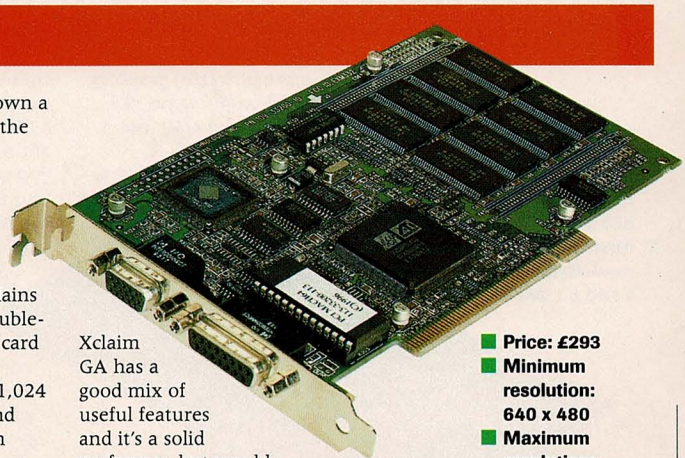
ATI's entry-level card comes with a 64-bit graphics processor and 2Mb of VRAM, which can be expanded to 4Mb. The Xclaim GA can display millions of colours up to 832 x 624, thousands up to 1,152 x 870, and 256 up to 1,600 x 1,200. The card has both Mac and SVGA ports and an auto-sense function that interrogates your monitor to find out which resolutions it supports. It also has hardware zoom and scroll facilities built-in.

The zoom feature magnifies your on-screen image by up to four times and can be activated by a configurable keystroke. There is also a Virtual Desktop feature.

The software consists of two driver Extensions, a Control Panel and an Apple Guide file to consult if you get lost. A neat function is the way the software enables you to change colour depth or resolution from a pop-up menu. Hold down a configurable key combination, click the mouse anywhere on screen and it appears – even when you're in an application at the time.

The documentation with the Xclaim GA is good when you're setting up. It covers fitting the card and installing the software, and explains the basics quite well. There is no troubleshooting section though. Fitting the card presented no problems, though we couldn't get it to display more than 1,024 x 768 on our AppleVision 1710. Mind you, some of the cards couldn't even manage this.

The real world tests were pretty average. It ploughed through the 30,000 word *Nisus* scroll in 28.36 seconds and the *Photoshop* scroll in a slightly more impressive 19.76 seconds. Overall, the Xclaim GA has a good mix of useful features and it's a solid performer, but would benefit from a price cut.



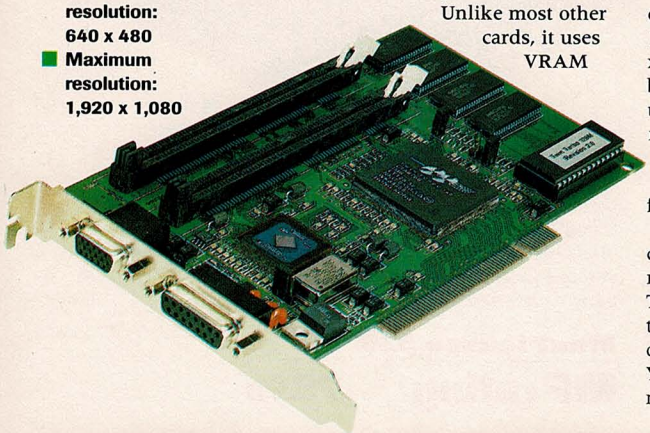
- **Price: £293**
- **Minimum resolution: 640 x 480**
- **Maximum resolution: 1,600 x 1,200**

ATI Xclaim GA

MF rating 79%

IMS Twin Turbo 128M2

- **Price: £352**
- **Minimum resolution: 640 x 480**
- **Maximum resolution: 1,920 x 1,080**



Integrated Micro Solutions' Twin Turbo 128M2 is based on a 128-bit graphics processor with 2Mb of VRAM that can be expanded to 4Mb. Unlike most other cards, it uses VRAM DIMM slots – identical to those on your PCI PowerMac's motherboard – so upgrading is both easy and cheap.

The Twin Turbo supports millions of colours up to 832 x 624, thousands up to 1,152 x 870, and 256 colours up to 1,920 x 1,080. It also has basic features such as built-in hardware zoom, but instead of using the pixel-doubling method used by most cards, it pans a large virtual screen around your monitor, meaning that the image remains lovely and sharp even at four times magnification.

The card also comes with gamma correction for your monitor, and acceleration for QuickTime and MPEG movies. The Control Panel supplied is certainly the easiest to use of all on test and is well designed, but rather lacking in features. You do however get a Control Strip module which enables you to change resolution "on the fly" without using the Control Panel.

The documentation supplied is good and explains fitting the card and installing the software. The troubleshooting section is rather light though. Fitting the card was easy. It worked without problem in all of the Pulsar's six PCI slots and had no compatibility problems.

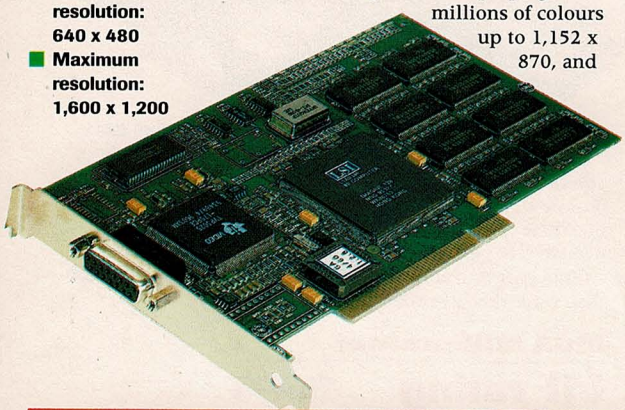
When it came to the real-world tests, the Twin Turbo was slower than the other 128-bit cards. It dragged through the text scroll in 28.87 seconds and the *Photoshop* file in 20.17 seconds. Overall though, we liked it for its ease of use and upgradability. It was uncomplaining, well behaved and has the friendliest software.

IMS Twin Turbo 128M2

MF rating 83%

Formac ProVision 4/60

- **Price: £499**
- **Minimum resolution: 640 x 480**
- **Maximum resolution: 1,600 x 1,200**



The Formac ProVision 4/60 is based around a 128-bit Imagine graphics processor with 4Mb of VRAM. It is capable of displaying millions of colours up to 1,152 x 870, and thousands up to 1,600 x 1,200.

The card has built-in hardware zoom at up to eight times magnification, gamma correction and a font cache for speeding up drawing fonts on screen. It also has its own built-in screen saver, window drag and a function for vastly increasing the size of the cursor. Most of its features can be accessed at any time by configurable hot keys. You can also select a pre-defined resolution on startup by holding down specific keys.

The Control Panel that forms the driver software is easy to follow, and supports Balloon Help, but you will need to use Apple's **Monitors** Control Panel to change the colour depth or resolution.

The documentation is good and includes fitting the card, installing the software and a small troubleshooting section. It's full of information on how to connect it to specific monitors and notes on how to get the best out of the card.

Installation was straightforward and we had no problem hooking up a 17-inch Apple monitor. We couldn't get the ProVision to work alongside the Pulsar's own graphics card, but removing the Pulsar's card resolved this problem.

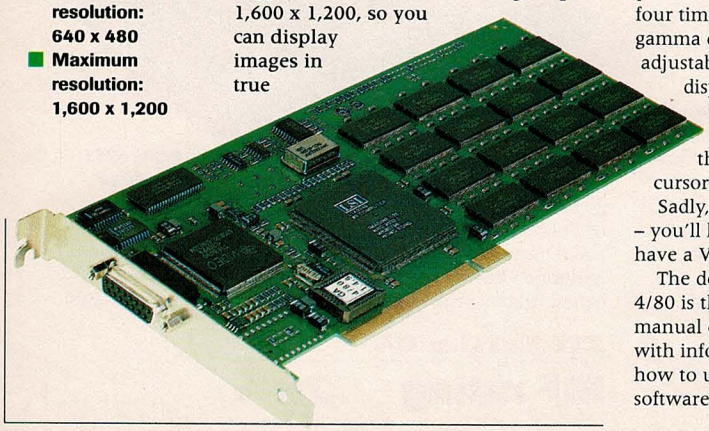
In the real world tests, the ProVision 4/60 was very fast. It rattled through the text scroll in 20.07 seconds and the *Photoshop* file in 11.85 seconds. Overall we were very impressed – this ProVision 4/60 has a broad range of features and is reasonably priced.

Formac 4/60

MF rating 87%

Formac ProVision 4/80

- **Price: £676**
- **Minimum resolution: 640 x 480**
- **Maximum resolution: 1,600 x 1,200**



Formac's more powerful graphics card is based on the same 128-bit processor as the 4/60, but with 8Mb of on-board VRAM. It supports millions of colours right up to 1,600 x 1,200, so you can display images in true colour no matter what resolution you set your monitor to.

Feature-wise, it's similar to the 4/60 and at the press of a configurable key you can zoom in on the image by up to four times. You also get adjustable gamma correction on startup and an adjustable font cache for accelerated text display (though it does use the Mac's memory for that, not its own). Other features such as the window drag and enlarged cursor are less useful.

Sadly, there's no VGA port on this card – you'll have to use an adaptor if you have a VGA monitor.

The documentation for the ProVision 4/80 is the same as for the 4/60 – the manual covers both cards. It's packed with information on fitting the card and how to use the Control Panel driver software, but here's only a limited troubleshooting section.

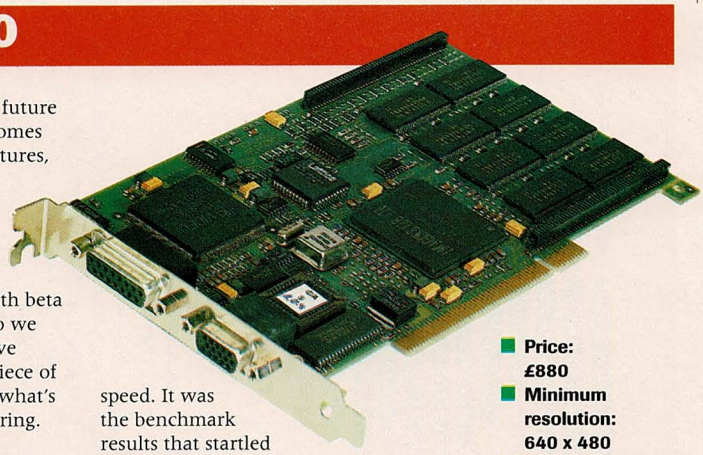
Fitting the card is easy and our set-up had no problems recognising it even without the driver software installed. Bear in mind, however, that this is a 9-inch card, so if you own a Mac clone, it may not fit in one or more of the PCI slots (in our Pulsar, this meant the first slot next to the processor).

In the real world tests, the 4/80 whipped through the text scroll in 19.96 seconds and the *Photoshop* file in 12.16 seconds. Overall, this is a blazingly fast card with a lot of features, but at nearly £700 it's well into the realms of the professional. If you can live with thousands of colours instead of millions at high-res, then the 4/60 might be a better buy.

Formac 4/80

MF rating 81%

Formac ProFormance 80



- **Price: £880**
- **Minimum resolution: 640 x 480**
- **Maximum resolution: 1,920 x 1,080**

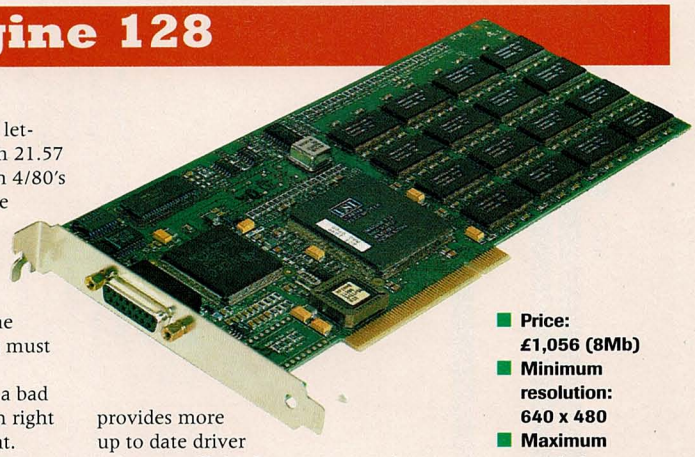
Another Formac card, the ProFormance 80 is based on the brand new 128-bit Imagine II graphics processor and has 8Mb of on-board VRAM. Like the Matrox MGA Millennium (reviewed on page 61) it's a combined graphics card and QuickDraw 3D accelerator, but unlike the Millennium it's very expensive.

The ProFormance 80 supports millions of colours up to 1,920 x 1,080, although you might have problems finding a monitor that can do this! It also accelerates playback of QuickTime movies at up to 30 frames per second. We tried this out using a half-screen movie and it was indeed very smooth. The QuickDraw 3D acceleration was fast and effortless, but at the time of writing does not support texture mapping. Formac claims to have updated the driver so that it now does, and the new driver will ship with future cards. The ProFormance 80 also comes with Formac's usual bundle of features, which are identical to that of the ProVision 4/80 – hardware zoom, gamma correction for better colour fidelity, and a font cache.

Sadly, our test unit was a finalised production model but with beta driver software and no manual, so we can't actually give it a rating. We've included it because it's a serious piece of new technology and a glimpse of what's to come – and well worth considering.

In our real-world tests the ProFormance card came a close second to the MGA Millennium. It managed the text scroll in 19.29 seconds and the *Photoshop* file in 10.32 seconds. With the updated software, however, Formac claims to be looking at a 15% increase in speed. It was the benchmark results that startled us, though. The ProFormance was way ahead of the field – 30% faster than the ProVision 4/80 and over twice as fast as the Millennium. However, costing almost much as an entry level Mac, it's incredibly expensive.

No.9 Technologies Imagine 128



- **Price: £1,056 (8Mb)**
- **Minimum resolution: 640 x 480**
- **Maximum resolution: 1,600 x 1,280**

Number Nine's Imagine 128 graphics cards are almost identical to Formac's ProVision range (the 4Mb version to the 4/60, the 8Mb version to Formac's 4/80). This is because Formac makes both. There are minor differences, mainly in the manufacture of the component chips, but essentially they are the same.

The driver software supplied is also similar, but Imagine's version is slightly older than Formac's. According to Formac, each revision of the software can speed up the card by as much as 15%, so this is critical. The actual options the card supplies is the same as the ProVision range.

The documentation goes into great detail on how to fit it and get the best out of it. There's a lot of information here – maybe too much!

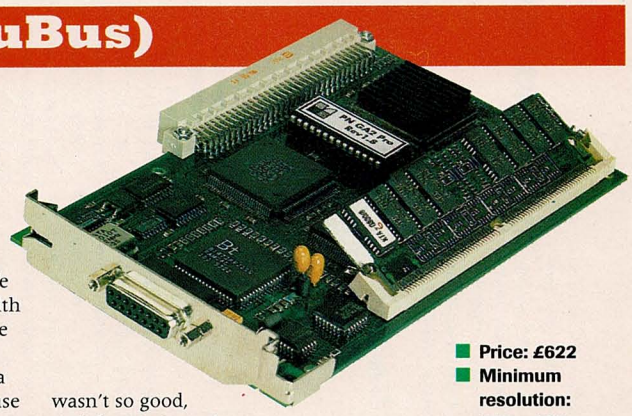
In tests, the Imagine card was a let-down. It managed the text scroll in 21.57 seconds compared to the ProVision 4/80's 19.96, but on the *Photoshop* test the gap was wider, with the Imagine taking 13.51 as opposed to 12.16 seconds. The benchmark tests showed the biggest discrepancy, with the ProVision 4/80 leading the Imagine 128 by around 30%. This must be down to the driver software.

Overall, the Imagine 128 is not a bad package. It's a good card in its own right and the documentation is excellent. However, what counts against it is the price – £90 more than the Formac equivalent for the 4Mb version, and a huge £380 extra for the 8Mb version. Only if Number Nine drops the prices and provides more up to date driver software will this be a serious option.

Imagine 128

MF rating 73%

Formac ProLegend GA (NuBus)



- **Price: £622**
- **Minimum resolution: 640 x 480**
- **Maximum resolution: 1,280 x 960**

The only NuBus-based card on test, the ProLegend comes with 3Mb of on board VRAM and supports millions of colours up to 1,152 x 870 and 256 colours up to 1,280 x 960. Interestingly, there is no option for thousands of colours. The GA Control Panel supplied is the same as with all other Formac cards.

One useful feature enables you to fit an 8Mb SIMM – the same as most Quadras and non-PCI PowerMacs – to the board for use as a cache. This is used for caching G-Worlds (see Jargon, page 60).

Other features include a screen saver, an adjustable font cache and hardware zoom up to four times screen size. This doesn't simply increase the size of the pixels, but magnifies your whole image while keeping 72 dots per inch on screen and supporting both millions of colours.

The documentation is reasonably good, covers fitting the card and goes into depth about the features. It is, however, extremely heavy reading and there's very little jargon explained, although there is a decent trouble-shooting section.

Because this is a NuBus-based card, we had to use a different set of tests. We plugged it into a PowerMac 7100/66 with 24Mb of RAM and compared it with the Mac's own built-in graphics card using *MacBench*, alongside our *Nisus* file, and a 832 x 10,000 pixel *Photoshop* file. Because the card doesn't support thousands of colours (and the Mac's own card doesn't support millions), we carried out the tests in 256 colours. As such, these results should not be directly compared with those of the PCI cards.

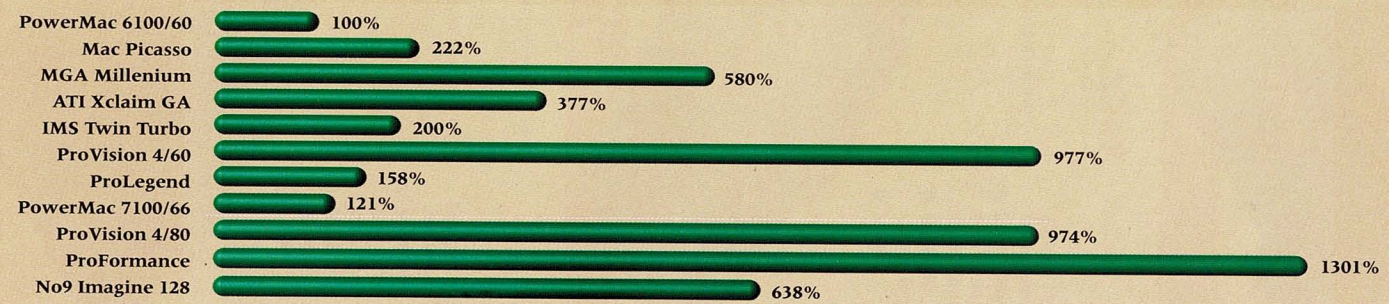
The ProLegend got through the text scroll in 70.88 seconds compared to the Mac's 88.10 seconds. The *Photoshop* scroll wasn't so good, and the Mac's card completed it15 seconds faster. Overall, the ProLegend has a good range of features, but it's not terribly fast.

Formac ProLegend GA (NuBus)

MF rating 80%

A full house of picture cards – how do they compare?

MacPicasso 520	Matrox MGA Millenium	ATI Xclaim GA	IMS Twin Turbo 128M2	Formac 4/60	Formac 4/80	Formac Pro-Formance 80	Technologies Imagine 128	Formac ProLegend GA
Price: £200 **Out:** Now **Contact:** Blitter-soft on 01908 261477 **Web site:** http://blittersoft.wildnet.co.uk **Mac:** any PCI PowerMac **Warranty:** two years	**Price:** £234 **Out:** Now **Contact:** Matrox on 01793 441100 **Web site:** http://www.matrox.com **Mac:** any PCI PowerMac **Warranty:** three years	**Price:** £293 **Out:** Now **Contact:** ATI on 01235 833666 **Web site:** http://www.atitech.com/ **Mac:** any PCI PowerMac **Warranty:** five years	**Price:** £352 **Out:** Now **Contact:** Principal on 01793 441100 **Web site:** http://www.principle.co.uk **Mac:** any PCI PowerMac **Warranty:** three years	**Price:** £499 **Out:** Now **Contact:** Formac on 0181 533 4040 **Web site:** http://www.formac.com **Mac:** any PCI PowerMac **Warranty:** one year	**Price:** £676 **Out:** Now **Contact:** Formac on 0181 533 4040 **Web site:** http://www.formac.com **Mac:** any PCI PowerMac **Warranty:** one year	**Price:** £880 **Out:** Now **Contact:** Formac on 01793 441100 **Web site:** http://www.formac.com **Mac:** any PCI PowerMac	**Price:** 4Mb £586, 8Mb £1,056 **Out:** Now **Contact:** No.9 Technologies on 01582 483381 **Web site:** http://www.nine.com **Mac:** any PCI PowerMac **Warranty:** one year	**Price:** £351 **Out:** Now **Contact:** Formac on 01793 441100 **Web site:** http://www.formac.com **Mac:** Any PCI PowerMac **Warranty:** one year
Specs	**Specs**	**Specs**	**Specs**	**Specs**	**Specs**	**Specs**	**Specs**	**Specs (Nubus only)**
Min. resolution: 512 x 384 **Max. resolution:** 1,600 x 1,200 **Connector ports:** Mac, SVGA **Data path:** 64-bit **Special features:** QuickDraw acceleration **Configuarations available:** 2Mb, 4Mb **Version tested:** 2Mb	**Min. resolution:** 640 x 480 **Max. resolution:** 1,600 x 1,200 **Connector ports:** VGA, **Processor:** 64-bit **Special features:** QuickDraw acceleration, QuickDraw 3D acceleration, hardware zoom, virtual Desktop **Configurations available:** 4Mb, 8Mb **Version tested:** 4Mb	**Min. resolution:** 640 x 480 **Max. resolution:** 1,600 x 1,200 **Connector ports:** Mac, SVGA **Processor:** 64-bit **Special features:** QuickDraw acceleration, hardware zoom, virtual Desktop. **Configurations available:** 2Mb, 4Mb **Version tested:** 2Mb	**Min. resolution:** 640 x 480 **Max. resolution:** 1,920 x 1,080 **Connector ports:** Mac, VGA **Processor:** 128-bit **Special features:** QuickDraw acceleration, hardware zoom, gamma correction. **Configurations available:** 2Mb, 4Mb **Version tested:** 2Mb	**Min. resolution:** 640 x 480 **Max. resolution:** 1,600 x 1,200 **Connector ports:** Mac **Processor:** 64-bit **Special features:** QuickDraw acceleration, hardware zoom, gamma correction, font cache, screen saver, window drag, enlarged cursor. **Configurations available:** 2Mb, 4Mb **Version tested:** 2Mb	**Min. resolution:** 640 x 480 **Max. resolution:** 1,600 x 1,200 **Connector ports:** Mac **Processor:** 128-bit Imagine **Special features:** QuickDraw acceleration, hardware zoom, gamma correction, enlarged cursor, window drag, font cache, screen saver. **Configurations available:** 8Mb **Version tested:** 8Mb	**Min. resolution:** 640 x 480 **Max. resolution:** 1,920 x 1,080 **Connector ports:** Mac, VGA **Processor:** 128-bit Imagine II **Special features:** QuickDraw acceleration, QuickDraw 3D acceleration, QuickTime acceleration, hardware zoom, gamma correction, enlarged cursor, window drag, font cache, screen saver. **Configurations available:** 8Mb **Version tested:** 8Mb	**Min. resolution:** 640 x 480 **Max. resolution:** 1,600 x 1,280 **Connector ports:** Mac **Processor:** 128-bit **Special features:** QuickDraw acceleration, hardware zoom, gamma correction, enlarged cursor, window drag, font cache, screen saver. **Configurations available:** 4Mb, 8Mb **Version tested:** 8Mb	**Min. resolution:** 640 x 480 **Max. resolution:** 1,280 x 960 **Connector ports:** Mac **Processor:** 64-bit **Special features:** QuickDraw acceleration, hardware zoom, gamma correction, enlarged cursor, window drag, font cache, screen saver. **Configurations available:** 3Mb **Version tested:** 3Mb



How do they perform?

This graph shows the cards' *MacBench* benchmark results, relative to a 6100/66. That model was the base-level PowerMac, it always came fitted with 1Mb of VRAM, and this was not expandable, so that model represents a stable benchmark.

What's the verdict?

The overall winner has to be the MGA Millennium from Matrox. Technically speaking, it wasn't the fastest card on test and it did seem to have a few quirks, but then so did some others – and the Millennium certainly offered the best value for money. £234 for a 128-bit graphics card is pretty good, but £234 for a 128-bit graphics card with QuickDraw 3D acceleration built-in is spectacular. It's just a shame it can only be used in the PCI PowerMacs and not in the new range of Apple Performas, or in older non-PCI Macs.

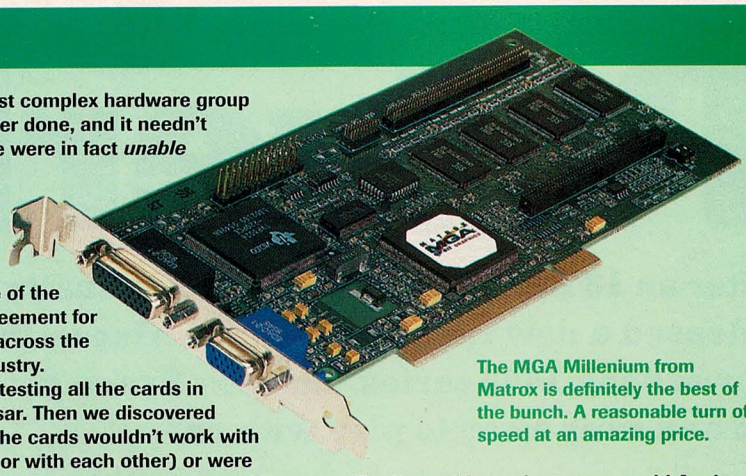
Other notable mentions include the MacPicasso, which is a reliable (if odd looking) card that covers the less pricey end of the market and is ideal for the home user who wants to gain a bit more Desktop space without spending a fortune.

If you work with graphics in a professional capacity though, our recommendation is Formac's ProVision 4/60, which comes with a host of useful features and is very fast indeed. We were also mightily impressed with Formac's new baby, the ProFormance 80, which combines both graphics acceleration and 3D capabilities – but it does come at a price.

One general point. This was undoubtedly one of the most complex hardware group tests we've ever done, and it needn't have been. We were in fact *unable* to review a substantial number of other cards. This seems to be because of the lack of an agreement for a "standard" across the computer industry.

We started testing all the cards in the Umax Pulsar. Then we discovered that some of the cards wouldn't work with the machine (or with each other) or were fussy about which slot they were plugged into. We tried to start again with the office PowerMac 7200 – but some of the cards didn't work in that either.

Then there was the added complication of monitors. We started testing using an AppleVision 1710 monitor, but most of the cards wouldn't work with it or offered only one resolution. We tried a MAG Innovision monitor and it was better, but still half the cards had trouble recognising it as being multi-sync.



The MGA Millenium from Matrox is definitely the best of the bunch. A reasonable turn of speed at an amazing price.

Finally, we blagged a two-year-old Apple 17-inch Trinitron monitor and got this to work with all of the Mac-port only cards and goaded or threatened the other cards into working with the MAG monitor and the Pulsar. In the end, those that wouldn't work didn't get reviewed – easy choice to make.

The moral of the story is quite simple, and it's a message to Apple, Mac clone manufacturers, monitor makers, and expansion card companies: sort out yer slots!

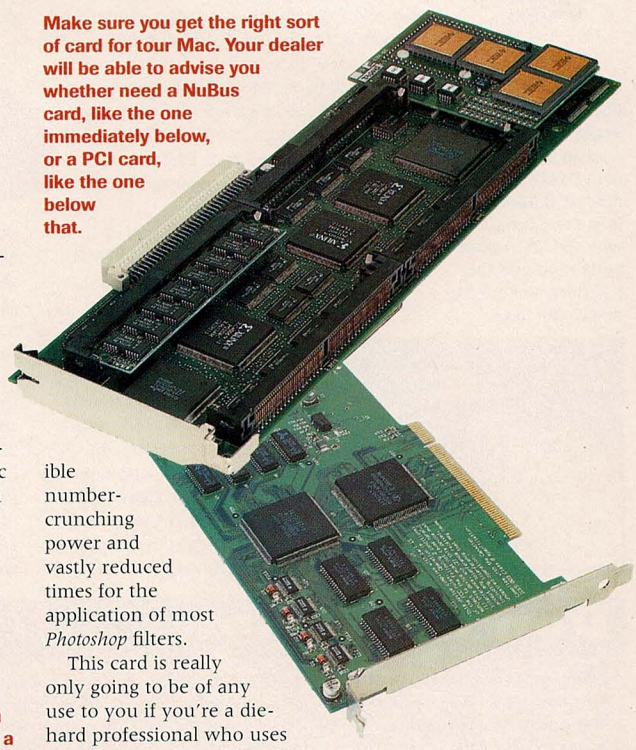
In addition

As well as graphics cards, there are a whole host of other expansion cards you can plug into your Mac, such as a SCSI (Small Computer Systems Interface) card to give you better external driver performance, Ethernet networking cards for faster data transfers over a networks, and application-specific accelerator cards. It's this last category of cards that's full of the really interesting stuff, and many of them do at least some of the same jobs as the general graphics cards we've been looking at.

The category includes things like Apple's QuickDraw 3D accelerator card. This card vastly accelerates the on-screen rendering of QuickDraw 3D compliant models and games – sometimes making them as much as 12 times faster. Apple's QuickDraw 3D accelerator card is £335. For more details contact Apple on 0800 127 753. Some of the graphics cards we've reviewed here – the Formac ProFormance and Matrox's MGA Millennium for example – also support and accelerate QuickDraw 3D.

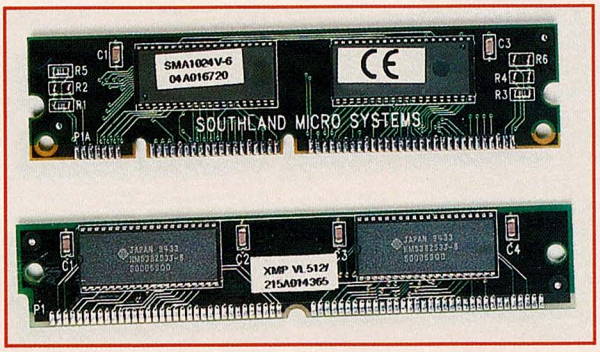
These cards fall into the category of "combination" or "Combo" cards. These perform more than one function – particularly handy if you're short on slots.

Other application-specific accelerator cards are available for... well, more specific functions, such as the PowerShop *Photoshop* accelerator. This massive card (two 12-inch circuit boards!) plugs into your Mac and accelerates certain functions only in *Photoshop*. The card is available in both PCI and NuBus versions, holds no less than 64 processors and provides incredible number-crunching power and vastly reduced times for the application of most *Photoshop* filters.



Make sure you get the right sort of card for tour Mac. Your dealer will be able to advise you whether need a NuBus card, like the one immediately below, or a PCI card, like the one below that.

This card is really only going to be of any use to you if you're a die-hard professional who uses *Photoshop* nearly exclusively and would otherwise have to spend three times as much on a new Mac to get the same kind of image processing power. The card costs a whopping £1,992. For more details, contact Cromenco on 01959 577 002, and look out for more information about the PowerShop board in MACFORMAT soon. **MF**

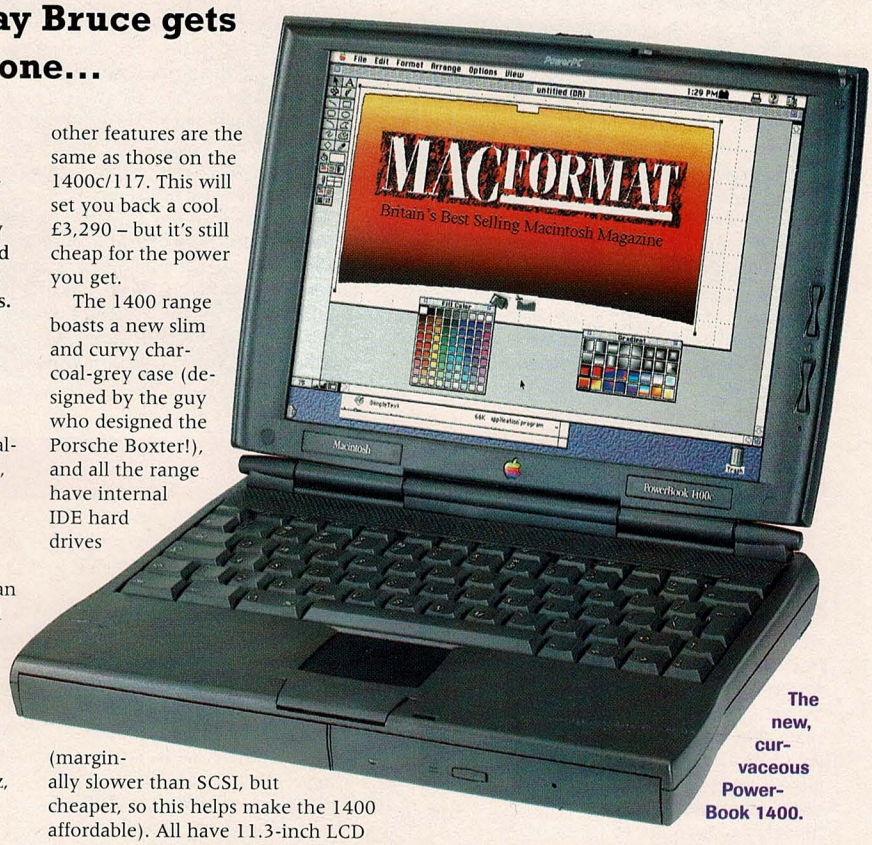


The essence of displaying more colours on your Mac – VRAM. Don't forget, even if you can't afford a graphics card, you might be able to afford some more of this.

PRICE	ON SALE	CONTACT	WEB SITE
1400cs/117 – £1,974; 1400c/117 – £2,937; 1400c/133 – £3,290	Now	Apple on 0800 127753	http://www.apple.com

PowerBook 1400c/117

After an 18 month hiatus, Apple has finally released a new range of portable Macs – the PowerBook 1400 series. Lindsay Bruce gets up and runs away to play with one...



The new, curvaceous PowerBook 1400.

It's been 18 months since Apple introduced the first PowerPC PowerBooks – the 5300 series – but with the speed at which technology is advancing, they are now showing their age. They've lost ground to PC notebooks that match the 5300's performance but cost substantially less. Now Apple has fought back with a radical new design, boasting desktop-computer power at unheard-of prices.

There are three models in the range. First up is the 1400cs/117. It features a PowerPC 603e running at 117MHz, dual-scan 800 x 600 pixel colour LCD screen, 12Mb of RAM, a 750Mb internal hard disk and a floppy drive – all for £1,974. Not cutting-edge, but it's an extremely powerful machine for the money.

For a few hundred quid more, you can get one with 16Mb of RAM, a six-speed CD-ROM drive, a carrying case and a colour StyleWriter 2200 portable printer. This comes in at £2,584, making it an attractive package for the professional on the move.

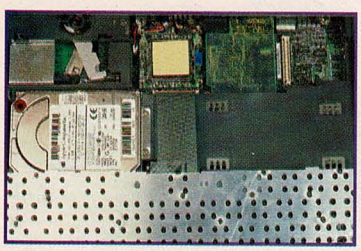
In the mid-range is the 1400c/117, with the same 603e running at 117MHz, but an active-matrix 800 x 600 LCD colour display, 6x CD drive, 1Gb hard disk and 16Mb of RAM. The 1400c/117 will cost you £2,937.

Top of the range is the 1400c/133, which sports a 603e chip running at a speedy 133MHz, and a 128K Level 2 RAM cache (which speeds up data retrieval). All the other features are the same as those on the 1400c/117. This will set you back a cool £3,290 – but it's still cheap for the power you get.

The 1400 range boasts a new slim and curvy charcoal-grey case (designed by the guy who designed the Porsche Boxter!), and all the range have internal IDE hard drives (marginally slower than SCSI, but cheaper, so this helps make the 1400 affordable). All have 11.3-inch LCD screens, two PC-Card (PCMCIA) expansion slots, infra-red networking, and a built-in speaker and microphone. The speaker is, sadly, only mono, but there is 16-bit stereo sound in and out via ports on the back. All models come with a floppy disk drive, which is "hot-swappable" with the CD-ROM drive (supplied with all the range except the 1400cs; for that model it's an option that will set you back an extra £230 or so).

ON THE CD

Interactive multimedia intro in the **Demos** folder



Flip out the keyboard for easy access to the guts of the 1400. The PowerPC 603e chip is at the centre, with the RAM slots to its right and the IDE hard disk below and to the left.

The CD drive is an ATAPI device (a format common on PCs and similar to IDE – it was also chosen for cost-cutting reasons). Apple says that Iomega Zip drive and 230Mb magneto-optical drive options should also be available soon.

Swapping drives is a cinch – you just eject the CD or floppy first, and a catch underneath releases the drive module, which simply slides out. Or you can even carry a spare battery around in this slot.

The new screens are a major breakthrough in both price and quality. The 1400cs uses a dual scan (passive) LCD matrix, while both the 1400c versions have active matrix displays. Both types can display thousands of colours at a resolution of 800 x 600 pixels, and the active matrix variety is undoubtedly the most impressive flat screen we've seen on any portable Mac or PC. The display is crisp and sharp from all but the most oblique of viewing angles, and the colours have real depth. Greys are still a bit of a problem, as they are on all LCD screens – they do look a bit flat and tend to have a slightly "blue" hue – but they have been

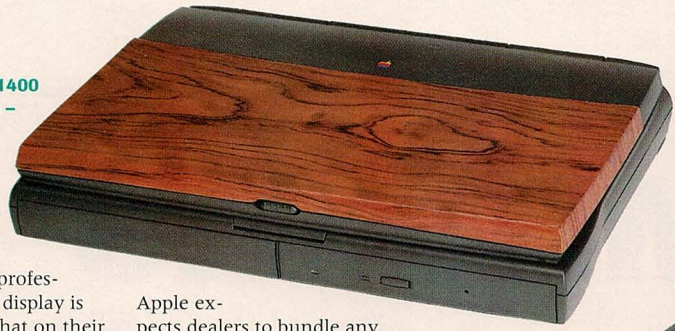
Don't look now

There are two basic types of LCD screen: active and passive matrix. Passive matrix screens are cheap, low-power affairs that are easy to produce, but the image quality isn't terrific. Colours tend to look washed out, lack contrast and can be adversely affected by both the light conditions around you and the angle at which you view the screen.

Older PowerBook screens also suffered from "submarining" - the cursor completely disappears if you move it too quickly across the screen - and ghosting, where a faint double image of object on screen can be seen.

To compensate for some of these problems, dual-scan technology was developed. This simply splits the screen in half and the two halves are refreshed independently. This speeds up the screen's refresh rate and solves the problem of the cursor vanishing.

Active matrix screens are more complex, as every single pixel on screen has its own controlling transistor. This speeds up the refresh rate, improves the colours, and negates some of the problems with lighting and viewing angles. On the other hand, active matrix screens consume more power and are much more expensive... at least until now!



Personalise the look of your 1400 with new BookCover™ panels – one is clear plastic for you to slip your own insert under.

much improved. We're still not completely convinced that any LCD screen can deliver the colour fidelity for professional graphics work, but this display is even better than flat screens that on their own cost hundreds of pounds more than a PowerBook. Very impressive.

The 1400 boasts not a mouse (though there is an ADB port where you can plug one in, or a conventional keyboard) or a trackball but a trackpad. Unlike the 5300 series' trackpad, this supports tapping, double-tapping and click-dragging. This means you can move files, use menus and click buttons without resorting to using the trackpad button – useful if you're not adept at "clicking" with your thumb. The trackpad can take a bit of getting used to – when you're typing, your thumbs naturally rest near the trackpad, making accidental clicks a frequent annoyance. Luckily for the incurably clumsy, a Control Panel gives you the option of turning this feature off.

Get tapping

The other input innovation is the keyboard, which sports all the standard keys, plus 12 function keys. It's slightly less than full-sized, but once you get used to it you find that graphics in *Photoshop* are no more trouble than typing text.

Around the back of the 1400 are seven ports, with all the connectivity of a desktop Mac. The AC adaptor and the headphone and microphone ports are to the left, and the lesser-used ports (combined printer/modem port, PowerBook SCSI and ADB) are hidden under a flip-down panel, along with a reset button. The expansion slot connection is also here, hidden under a knock-out panel. Finally, there's an infra-red networking transceiver for truly wireless communication as well as file-sharing with other PowerBooks. (We weren't able to test this, so we can only hope Apple has made advances as significant here as in the other technologies in the 1400 – IR networking on past PowerBooks rarely worked, and when it did it could be unreliable...)

At the far end of the back panel is a security slot for locking up your PowerBook, although the locking mechanism is not yet available. On the left side of the casing are the PC Card (PCMCIA) slots that accept two Type II PC Cards or one Type III card, enabling you to connect card-based devices such as modems. No modem was fitted to our test unit, but Apple expects dealers to bundle any of a range of modems when you buy a 1400, and wants to encourage firms to make peripherals and accessories for the PowerBook. ISDN, fast networking and video expansion cards are expected, and a company called KISS has announced a solar panel to extend your battery life! (For details call 01300 341134 or fax 01300 341135.)

The 1400's sleek case conceals a well thought out and ingenious design. Getting inside is simply a matter of sliding the speaker grille to the left and removing it. The keyboard then flips up and out. The processor is hidden under a metal heatsink, which is held in place simply by six small crosshead screws. Pop the heatsink out and you have easy access to the processor, expansion slot, and memory. The processor (with clock chip) is designed to be easily replaceable when an upgrade becomes available. Next to it is the expansion slot, in which you can fit either an Ethernet or video-out card – the latter would, for example, enable you to connect your PowerBook to a projector for presentations.

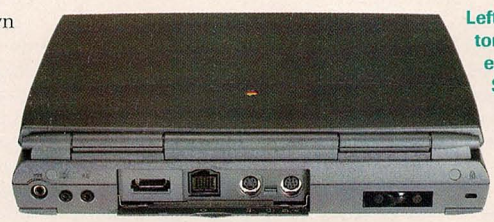
Past the expansion slot is the memory. The 1400 series supports stackable memory – to upgrade your RAM, you simply plug in a memory card (SIMM) on top of an existing one. This means you can get the most from your investment in RAM, and upgrade it all the way up to 64Mb.

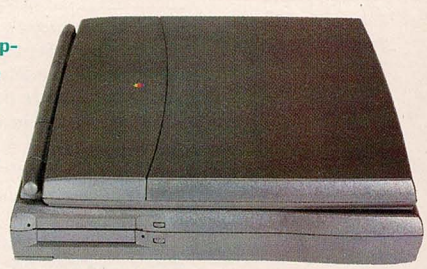
The 1400 is powered by a single Nickel-Metal-Hydride battery, which slots in the front next to the drive bay. You can expect between two and four hours of life from it in portable use – Apple says it's managed to slash power consumption so effectively that in tests, even accessing the CD drive continuously and with the screen undimmed, it lasted two hours, which wipes the floor with PC notebooks (where typically you'd be lucky to get 15 minutes' use with a CD running). Plugging in the AC adaptor – even while you're working – recharges the battery fully in around two hours.

The modular system of the 1400 series allows rapid swapping of floppy and CD drives – as long as there's no media actually in the drive you're removing, you don't even have to power down when swapping them.

All of the 1400s come with *ClarisWorks 4.0*, *Claris Organizer* and the *Apple Internet Connection Kit*, plus *Apple Remote Access* software for connecting to an office network via a modem, and a collection of compatibility software (*Macintosh Easy Open*, *PC Exchange* and *MacLink Plus* translators), useful should you need to swap files with the dreaded office PC.

Our test unit was a US version of the 1400c/117 without documentation or a modem – not identical to the units you'll be able to buy, so we can't give it a MACFORMAT rating. However, the PowerBook 1400 is Classic material, no question. It's not cutting-edge, as PowerBooks once were, but it's more than a match for any PC notebook, offering unparalleled portable computing – everything a desktop Mac can give you (even the expandability), with no significant premium for the portability any longer. For the first time, taking a Mac on the move really is almost irresistible. **MF**





Left: ports for AC adaptor, headphone, mic, external monitor, SCSI (PowerBook type), ADB and serial, plus infra-red networking. Right: PC Card slot access.

PowerBook 1400 features at a glance

Model	Clock speed	RAM/ Max.	Hard disk	Screen	CD Drive	L2 cache	Price
1400cs/117	117MHz	12Mb/64Mb	750Mb	Dual scan	Optional	No	£1,974
1400c/117	117MHz	16MB/64Mb	1Gb	Active matrix	6x	No	£2,937
1400c/133	133MHz	16Mb/64Mb	1Gb	Active matrix	6x	128K	£3,290

PRICE	£528.75	**ON SALE**	Now	**CONTACT**	Rotec Distribution on 01604 402012	**WEB SITE**	http://www.alps.com/
MAC	**Processor:** 68000 • **RAM:** 8Mb	**POWERMAC**	**Processor:** any • **RAM:** 8Mb	**REQUIRES**	**System:** 7.0 • **HD space:** varies according to use		

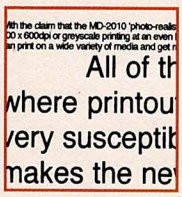
Alps MD-2010

MACFORMAT Classic

A new printer that promises not only the low cost and high quality of inkjet printing, but all without the mess? Rod Lawton puts Micro Dry™ printing to the test.

Alps claims that the MD-2010 "photo-realistic" colour printer represents the next generation of colour printers, thanks to its Micro Dry™ printing technology. Offering millions of colours at 600 x 600dpi, or greyscale printing at an even higher 1,200 x 600dpi, it certainly sounds great. What's more, the print-outs are supposed not to smudge, run when damp or fade on exposure to sunlight. *And* you can print on a wide variety of media and get metallic-ink cartridges for extra brilliance.

All of this contrasts with existing colour inkjet technology, where print-outs emerge damp and sometimes wrinkled, and are very susceptible to smearing even when the ink has dried.



The resolution on "special" paper is amazing. This 4pt Helvetica remains perfectly legible, with scarcely any "dottiness" or filling-in noticeable.

How it works

The reality is slightly anticlimactic. The MD-2010 doesn't use soggy ink but a line of four audio-cassette-style ink cartridges. To produce a full-colour print-out, the sheet passes through the printer four times – each time, a different cartridge is picked up and its own colour is deposited on the paper in a series of narrow horizontal strips.

This four-pass printing system means predictably long print times. Yet although the paper is wound to-and-fro repeatedly to build up the image, the accuracy is spot on and colours are precisely aligned.

Oddly, the Alps doesn't connect to the Mac's printer port. Instead, you plug it into the SCSI port. You'll need a SCSI lead and terminator because the machine is supplied without cables.

The Alps MD-2010 is not an inkjet, and doesn't plug into the printer port. It goes its own way – a bit like Apple, actually...

Installing the printer driver is straightforward enough, and you select it from the **Chooser** like any other device. You may need to tweak the SCSI ID to avoid conflicts with other peripherals, though, and you do this using some rather fiddly DIP switches in a recess on the back of the printer.

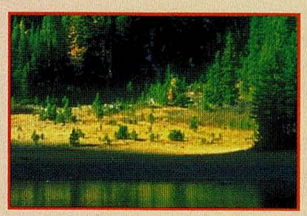
The printer itself is nicely designed, reasonably compact and sits on top of a novel paper-holding tray which you pull out when you want to do some printing. Of the three buttons on the top – **Power**, **Ready** and **Rest** – you're only likely ever to use the **Power** button. There are also indicator lights to show that the four ink cassettes are okay and what medium you're printing on – plain paper, transparency or "special".

Like inkjet printers, the MD-2010 needs the right printing medium to produce the best results. When you choose **Page Setup**, you need to specify the medium you're going to print on – and this automatically makes the optimum adjustments to print pattern (the way the dots of colour are combined to give the impression of millions of different shades) and print quality. On ordinary copier paper, the driver selects "medium" quality and a "fine" print pattern. These aren't the settings for highest quality, but they're designed to get the best possible quality from inexpensive paper. Even so, print-outs on plain paper lacked colour depth and proved quite "speckly" where dots of ink didn't "take" on the rough paper surface. On plain paper, the Alps print-outs may be more durable than inkjet equivalents, but inkjet printers will give slightly better results.

It's a different story on very smooth high quality paper, where the output quality is truly excellent – better than all but the best inkjets can produce on their special (expensive) coated paper. Indeed, it's as good as you'd expect from expensive dye-sub printers. If you look very hard, you can still make out the individual dots that make up the image, but this is offset by sharpness and resolution that dye-sub printers can only dream of.

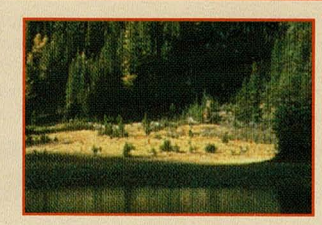
As with other colour printers, the final quality depends on the medium. The MD-2010 can print on a wide range of materials, including postcards, business cards, overhead projector film and transfer sheets. Only on the smoothest high-quality paper, though, do you get the definition and colour that the printer's capable of. On other media, you have to choose a compromise driver set-up that

And now in colour...

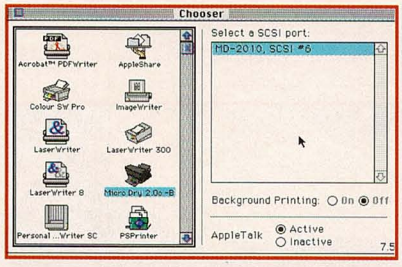


The Alps MD-2010 is billed as a "photo-realistic" colour printer, so we gave it this image from the Corel Collection to print out.

On plain paper, the resolution is low and the dithering very coarse. Colour reproduction is good – but that's scant consolation.



On special paper, the resolution and colour are quite superb, far better than even expensive inkjets are able to achieve.



The MD-2010 attaches to your Mac's SCSI port, but you find it in the Chooser just like any other.

uses a coarser dithering pattern to overcome the deficiencies of the medium.

The MD-2010's printing technology has many similarities to well-established thermal wax printing technology. Like wax printers, the Alps deposits its colour through thin, single-pass films, a colour at a time. The printouts have a very waxy feel, also displaying a wax-like ability to repel water. They also have the same poor, speckled look on low-quality paper. However, the MD-2010 can output at resolutions far, far higher than traditional wax printers, and without the "spreading" effect that limits the individual dot resolution of inkjets.

On glossy paper the colour reproduction, contrast and definition were quite excellent – although images printed out a little dark, with blues tending towards magenta and greens turning a little muddy. But this is normal for most colour printers, which are attempting to reproduce RGB (screen) colours with CMYK inks.

Joining a band

Because of the way the colour is laid down in strips, the MD-2010's printouts can sometimes exhibit thin lines between these strips. This, says the manual, is normal and unavoidable – but it becomes practically invisible on high quality paper anyway.

Quality street

On plain paper and other media it was a different story, with a much coarser dithering pattern and much lower resolution. Colour and contrast remain good even on plain paper, but images are too heavily dithered for this to be much consolation.

Text, on the other hand, is very sharp indeed. On plain paper the Alps can just match a 600dpi laser printer, while on glossy paper letters are uncannily smooth – a paragraph of 4pt Helvetica remained perfectly legible. The MD-2010 would be an excellent printer for producing "camera ready" pages for professional printing.

There are downsides, though. This is not the quietest printer we've tested, and the four-pass printing system makes it pretty slow too. And unless you use "special" paper, the results will be no better than those of even a modest inkjet. Nor is it a heavy-duty office machine – indeed, the manual gives specific instructions on the maximum number of pages you should print in a row before you let the print mechanism rest and cool down. But for occasional extremely high quality colour output, and at a very modest price, the MD-2010 really is a breakthrough in desktop colour printing. **MF**

Running costs

The MD-2010's ink cartridges cost £35 for a set of five. At 60% coverage printing in full colour, you'll get 40 pages out of a set. At 5% coverage (most text documents) in mono only, you'll get about 100 pages per cartridge. This means costs are comparable to colour inkjets – but you may find paper cheaper than inkjets' typical 10p a sheet.

Alps MD-2010

Slow and clackety though it might seem, the MD-2010 produces quite superb colour and definition – but only on high quality paper.

Features	**85%**
Ease of use	**90%**
Documentation	**(Not available to evaluate)**
Value for money	**92%**

MF rating 90%

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Connectix QuickCam Color

The result of a QuickCam shot of a transparency placed on a lightbox.

Live video conferencing, digital stills and movies – all in colour. That's a lot to promise for under £200. Photographer David Daye investigates...

ON THE CD

Find our pictures in the **Desktop Video** folder

Connectix, well-known for utility software such as the brilliant *RAM Doubler*, also happens to be a small-scale camera manufacturer. Its low-priced QuickCam still-image and video greyscale camera has now been joined by the QuickCam Color. This ups the stakes by offering higher resolution (640 x 480 pixels) and colour, at a price that's difficult to resist.

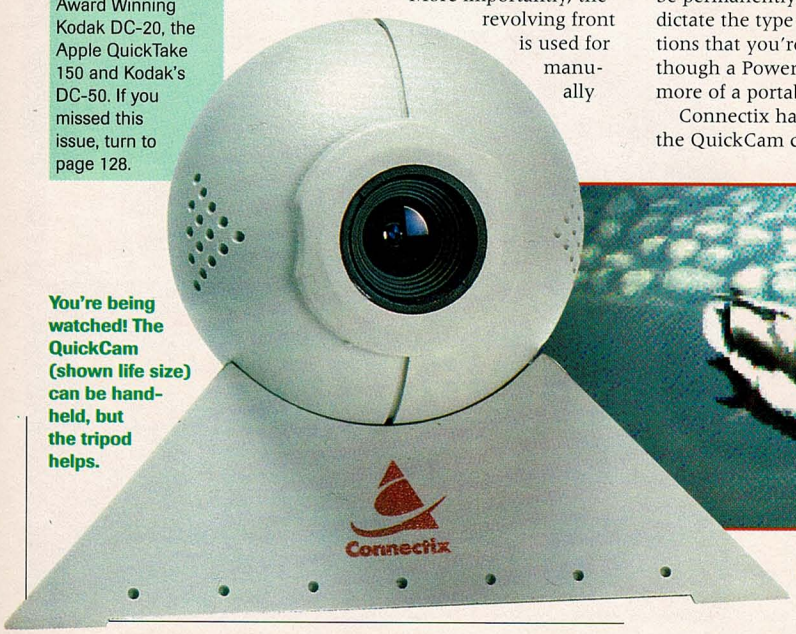
QuickCam Color is literally built around a charge-coupled device (CCD) plus the crucial VIDEC board that compresses the visual data. QuickCam Color looks almost identical to its mono predecessor, though the lens front is more open, no doubt to provide better access for the adaptor that Connectix claims will take additional standard 37mm threaded screw-on accessory lenses and filters.

More importantly, the revolving front is used for manually focusing the camera. Naturally enough, at this price, autofocus is not an option.

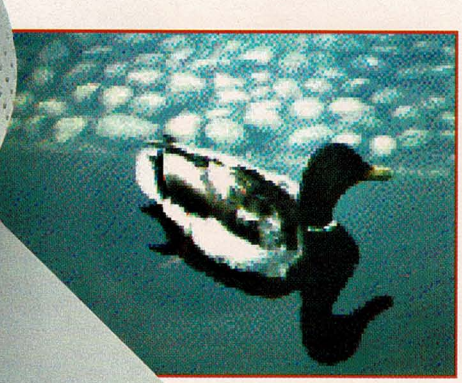
It takes its power supply from your Mac through a "piggy-back" option that links it to your ADB and serial ports.

Take two

In MACFORMAT 41 we took a look at three more digital stills cameras; the Classic Award Winning Kodak DC-20, the Apple QuickTake 150 and Kodak's DC-50. If you missed this issue, turn to page 128.



You're being watched! The QuickCam (shown life size) can be hand-held, but the tripod helps.



QuickCam copes with close-up shots very successfully.

Get the picture

Handling the QuickCam takes some getting used to. It's best to use the pyramid tripod supplied, ideal for perching on top of your monitor for video conferencing. (The software provides a handy **Flip** option in case things turn out upside down!) Alternatively the QuickCam can be attached to a standard tripod.

Once you've installed the *Quick PICT* software (for still images) and the *Quick Movie* for video, all the camera operations apart from focusing come under mouse control. When you're in picture-taking mode, an image frame appears with a "shutter button" and a slider to control brightness. Pressing the **Take Picture** button results in a loud "click" which assures you that the picture has been taken. A second **Viewer** window shows the captured – though not yet saved – image. These images can then be saved as PICT, TIFF or JPEG files.

The fact that the QuickCam needs to be permanently attached to a Mac does dictate the type of picture-taking situations that you're most likely to use it in – though a Powerbook, of course, makes it more of a portable proposition.

Connectix has sensibly ensured that the QuickCam can cope with either incandescent or fluorescent lighting, and the default settings give generally good results indoors. The red colour cast from tungsten room lighting can be neutralised by a simple adjustment of a slider under the **Camera Settings** menu.

The on-screen images are acceptable, though not pin-sharp, at the **Full** (640 x 480) screen resolution, but at £199 who's complaining? The **Quarter** setting is okay for a general impression, but not so good for detail. The **Half** (320 x 240) setting is possibly the best compromise for a comfortably viewable image with easy access to menus and windows.

The **Sharpness** setting enables you to choose from three levels – **High, Medium** and **Low**. For stills, **High** is the setting to be in, though it does give the slowest frame rates. In colour at the **Low** setting there's plenty of "noise". But it's definitely the mode to choose if you want video conferencing – there's still sufficient detail for you to be able to recognise faces. In greyscale mode, things greatly improve and there's a cleaner image. At the **Low** setting all the movements appeared in real time.

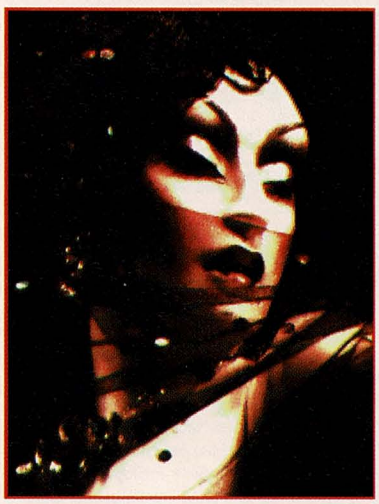
Options galore

For video, Connectix claims that the maximum number of frames per second is 24 at 160 x 120. This drops to 15fps for 320 x 240 pixels. You can record frame rates of up to 30fps, depending on both your Mac and the window size chosen. The more memory you have available, the better.

It's easy to record audio to go with your video sequence, using an external microphone. There's a choice of three audio sampling rates: 44KHz (VCR quality), 22KHz (AM radio) and 11KHz (telephone quality). You'll need plenty of hard disk space, though.

Options include a **Zoom** facility, which enables you to crop an image; there's also a self-timer range of either two or four seconds or a user-selectable option which also has an on-screen countdown display. **Auto Capture** enables you to take pictures at intervals of seconds, minutes or even hours. One

A picture taken in thousands of colours – at 256 colours or greyscale, the quality would be similar at half the screen size.



Any necessary colour adjustments can be made from the useful range of options in the Settings menu.

handy use for this is to update images on a Web page.

For camera buffs, the default shutter speed is 1/125sec, with a respectable total range of 1 to 1/1000sec plus B.

Finally, included with the QuickCam Color camera is the *QuickCards* CD, which enables you to make mini multimedia greetings cards. You'll need a 68030 machine at least, System 7 and 5.5 Mb of free RAM, as well as a double-speed CD-ROM drive. Using this application, it's possible to store around six pages of text plus a small movie on a floppy. With templates for greetings cards, there's lots of fun to be had here, plus some useful multimedia practice for a first-timer.

The QuickCam Color is an interesting and attractively-priced camera that enables you to take very acceptable still and video images, though without the speed, sophistication or higher quality you'd obtain with a digital camera and a camcorder costing nearer £1,000.

QuickCam Color

As an unpretentious, low-cost – and fun – entry to digital still and video images on the desktop, it's difficult to fault.

Features	**75%**
Ease of use	**82%**
Documentation	**82%**
Value for money	**87%**

MF rating 85%

What's a CCD?

A Charged Coupled Device is essentially an electronic retina: a sensor that translates incoming light into digital information – pixels, in other words. It was co-invented by Dr Gilbert F Amelio, who now happens to be Chief Exec of Apple Computer...

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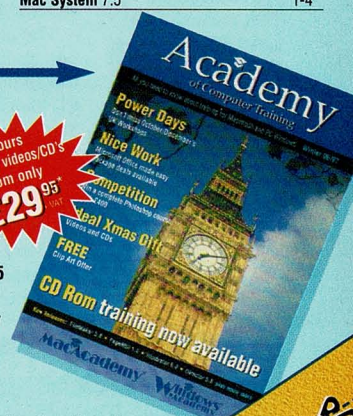

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3D World 2.0

The most interactive – and most inexpensive – 3D modelling package has been upgraded, so does it now live up to its promise? Marc Woods explores the third dimension on-screen.

QuickDraw 3D

This Extension enables you to create and manipulate 3D models in real time. Install it and you can see it work by opening the new Scrapbook and manipulating the samples in there. To create 3D objects yourself, however, you need more software – such as *3D World*.

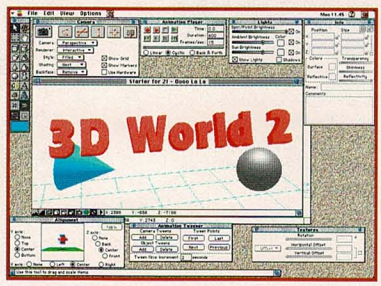
Render agenda

To render a 3D scene is to create a 2D image from that scene at a given camera position. The quality and detail of this depend on the rendering method. Raytracing is the best, showing far more detail (shadow, texture, etc) than a wire-frame (outline-only) view.

One of the great things about the Mac is the way that almost all software has a consistent interface, menus and keystroke commands. The reason for this is great for programmers too: the System includes a "toolbox" of ready-made routines for standard functions like displaying windows, menus and text, playing sounds and movies, and so on. About a year ago, Apple introduced the QuickDraw 3D Extension, which added to this list the ability to create and manipulate 3D models. *3D World* was the first program to make use of these new standard functions – indeed, it was practically a "shell" or front end that just gave you access to the features of QuickDraw 3D.

3D World is not only based on a System plug-in, it is almost entirely modular itself, so you can add features or remove any you don't need. Version 2.0's new plug-in architecture, far more advanced than in the first version, now supports plug-in palettes and commands as well as the original geometries and modifiers. *3D World 2.0* comes with over 30 plug-ins (see the box on the opposite page).

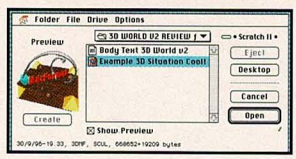
The packaging and main manual have not changed from the first version – only the addendum manual for version 2 and CD give any indication of the upgrade. The manuals are functional and easy to read, though sometimes lacking in detail. The package itself is more of a plug-in upgrade than a full reworking of the interface and functionality. *3D World* is still very bland in appearance, even old-fashioned. You are presented with a simple menu bar with **File**, **Edit**, **View**, **Options** and a **3D World** menu with quick access to the new plug-in menu commands. There are simple and functional palettes and tools, but *3D World* still lacks any advanced tools such as Bezier spline based tools and editors.



***3D World 2.0* sports a good number of palettes but the interface is very bland and old fashioned in appearance.**

The creation tools available aren't bad – here cogs, pipes, 3D text and a mountain form a good example of what can be done.

There's no final output renderer either, only QuickDraw 3D's wireframe, flat shading and Phong shading. This is a big drawback, since one of the greatest things about creating 3D models is seeing them in all their raytraced glory. Despite this lack, QuickDraw 3D, and therefore *3D World*, are very hardware intensive and demand a PowerMac (604-chip-based machines are now being recommended for heavier work) with at least 16Mb of RAM – more for anything beyond just playing around. However, *3D World* is the most interactive 3D program around – you can rotate and manipulate objects in real time. What's more, it fully supports Apple's QuickDraw 3D accelerator card available for PCI PowerMacs. This is not required but will give you massive speed increases, plus real time transparency. Note that without an accelerator card there is no way to view transparency within *3D World* – that would need software renderers that support it.



Previews of your scenes: just for once a program that creates a decent sized preview of your creations for those times when you forget what they look like!

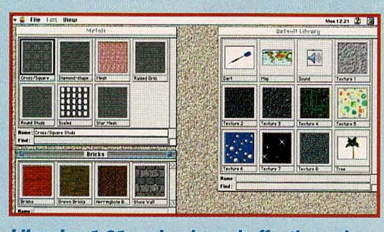
The animation facilities now included in the form of plug-in palettes are useful although unexceptional. The manual covers them well and makes the system easy to get used to. They are based on simple VCR-type controls with "tweening" controls for object and camera movement, but an upgrade will soon be available to bring the animation features more in line with the accepted standard of timeline-based animation construction.

In fact, *3D World's* new version is still in the same precarious state as its first incarnation was back in February: its success really depends on what new

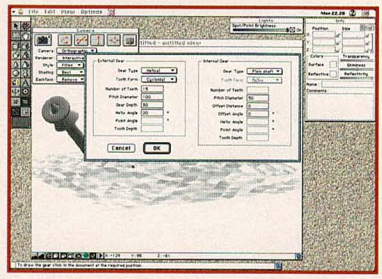
Librarian 1.01

Included with *3D World 2.0* is an extra program called *Librarian*, currently in version 1.01. It's an advanced Scrapbook for organising your models, textures, backgrounds and so on into easy palettes that enable you to drag and drop all of these into *3D World* constructions, and any other packages that support drag-and-drop.

It is pretty stable but there are a couple of unusual errors related to QuickDraw 3D. One annoying point is that *3D World* itself cannot import the palettes created in the *Librarian* (for use rather than editing). This means that the only way to put textures onto objects' backgrounds etc is either to copy and paste or drag and drop – not always the quickest option, especially on a smaller screen.

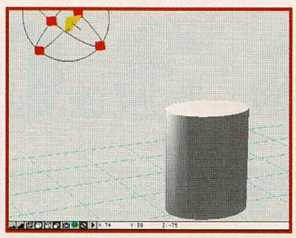


***Librarian 1.01:* a simple and effective solution for organising your textures, 3D clip art and patterns or backgrounds.**



One of the most powerful features is the gears generator – it creates gears and cogs. Very versatile, if you have a use for it.

features Apple builds into future versions of QuickDraw 3D and on what plug-ins Microspot or other parties may be able to come up with. QuickDraw 3D is currently at v1.0.6. The next upgrade is a major one, to version 1.5, due sometime before the end of this year. That new version will take the plug-in concept to a new level: QuickDraw 3D itself will be able to accept plug-ins for renderers, import, export and the like. With such additions, *3D World* could yet become a formidable challenge to the big boys of 3D.



Like everything else in *3D World* the lighting happens in real time. Move a light beam across an object and see it affect its surface.

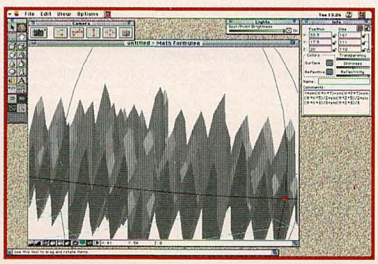
Version 2 of *3D World* is already *compatible* with QuickDraw 3D 1.5, but will not use any of its new features. An update to *3D World* will later become available that will take the package a step closer to being a really viable 3D modelling package.

By the time you read this there may well be yet more plug-ins available from Microspot's Internet site, such as a Boolean text modeller, for knocking text out of objects such as bricks. Many more are promised – Microspot's strategy with *3D World* is to upgrade the package continually via plug-ins and minor updates – in much the same way as Apple does.

And there is another twist: with the very open plug-in architecture built into *3D World*, it would be possible to write a game, for instance, as a plug-in using *3D World's* features and play it from within the program, turning *3D World* into a potential 3D *HyperCard*...

But all this is in the future. As it is, *3D World* is a little paradoxical. On the one hand, its ease of use and basic power make it a very good basic learning tool for budding 3D modellers, especially in educational contexts. On the other hand, you have a very powerful open architecture with a great deal of potential. The problem is that everything is "happening soon" rather than being available now and, as we all know, promises are not always kept in the computer world... Today, just like nine months ago, if you have twice the money and you're willing to sacrifice the interactivity that QuickDraw 3D gives you, virtually every other 3D program available offers a more advanced interface and functionality.

So if you're just getting into 3D, or aren't that concerned about final renders, or just want to play with a powerful 3D engine, *3D World* is not a bad choice, considering its price and potential. Buy it now and assume future developments go as planned, or wait to see how things go with QuickDraw 3D v1.5 and the pricing of third party renderers.



Another powerful idea: the Math Formula surface creator – input a complex formula and, hey presto, dodgy mountain ranges...

3D World 2.0

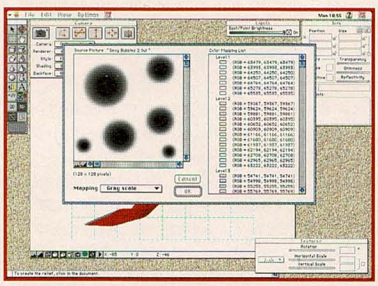
A powerful, great value, basic 3D package – a good toy and superb learning tool, but currently nothing more sophisticated.

Features	**70%**
Ease of use	**85%**
Documentation	**75%**
Value for money	**90%**

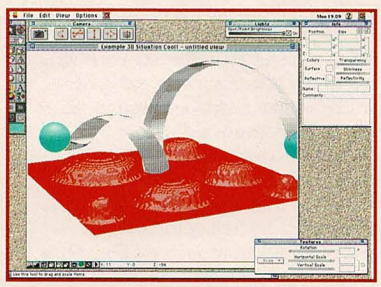
MF rating 78%

Go for a spin

Extrusion and Rotation are two simple ways of creating 3D models. Extrusion is akin to squeezing toothpaste through a 2D shape, creating a solid object with that 2D shape as its cross-section. Rotation rotates a similar 2D object around a defined axis to create objects such as wine glasses.



One way to create a landscape is to fiddle around in a graphics package and export the resulting greyscale image to *3D World*.



However, the final result after importing a greyscale relief map is not always as good as you might hope....

Plug and play – 3D World 2.0's plug-ins

Geometries (for creating objects)

- **Pipes: for creating pipes along a definable path; a few options are available.**
- **Mountain: gives you fractally generated mountains, either singly or in a group.**
- **Torus: for creating donuts!**
- **3D Text: creates 3D extruded text, which you can use like any other object.**
- **Gears: a new plug-in for the creation and specification of 3D gears and cogs.**
- **Math Graph: another powerful addition which enables you to create 3D surfaces from maths formulae; comes with examples.**
- **Pie Chart: creates a 3D pie chart based on your tab-delimited text on the Clipboard.**
- **Relief: a good tool for creating 3D surfaces from greyscale PICT files. Large PICTs can slow QuickDraw 3D to a standstill, though.**

Plug-in Modifiers (alter objects or scenes)

- **Colour: apply colours directly to objects.**
- **CSG: enables you to perform subtractive Boolean operations in real time. Only works if you have a 3D accelerator card.**
- **Add UV: for preparing imported 3D objects for *3D World's* texture mapping.**
- **Animate Colour: animates the colours of objects and lights.**
- **Animate Texture: enables you to animate textures applied to objects.**
- **Delete Attributes: speaks for itself!**
- **Distance: measures the distance between two points – a 3D ruler, in other words.**
- **Gravity: simply drops a selected object to the baseline grid in the working window.**
- **Light Director: manipulates and directs light sources, showing effects in real time.**
- **Bomb: blows your objects apart in real time!**
- **Orbit tool: select a sphere, say, drop the world map from the Scrapbook on it and you can fly around it as if you were in orbit!**
- **Internet: a good idea with great potential – build a 3D environment, then assign URLs (Web addresses) to objects. You can then jump to your favourite sites from your model.**
- **Lighting Director: simply enables you to point lights at your objects quickly.**
- **Shear: enables you to deform objects by shearing them in three dimensions.**
- **Spin: makes a selected object continually spin while you're working!**
- **Random Colour: click on an object and watch its colour change randomly...**
- **Teleport: clicking on an object in the scene takes you to a viewpoint in the centre of that object relative to your original view – this can lead to some pretty weird results!**
- **VR: gives you the same movement options available in QuickTime VR movies.**
- **Walkthrough: walk through your scene.**

Menu Commands (add extra menus)

- **Export: save and export a scene as a still PICT to any resolution (the first step towards rendering output).**
- **Earthquake: a disappointing real time animation plug-in.**
- **Rain: puts little blue lines on the screen and makes them move – not very convincing.**
- **Timer: in conjunction with the Help palette this gives you a constant update of QuickDraw 3D's frame rate.**

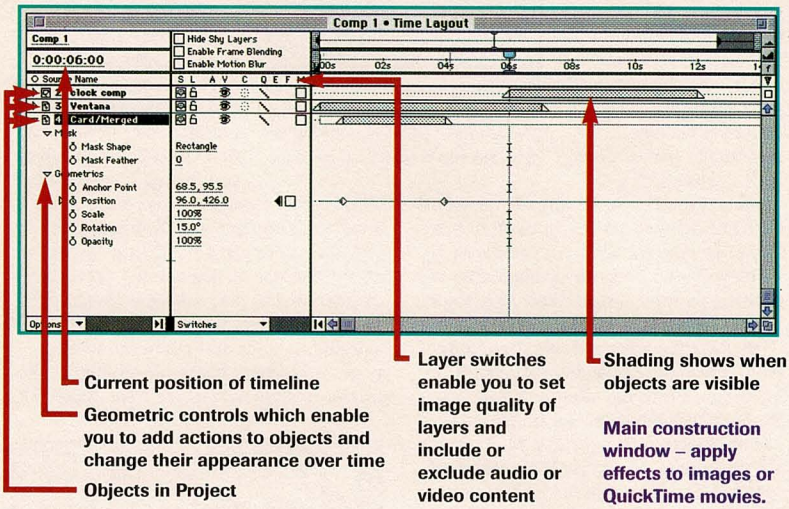
The Plug-in Palettes

- **Alignment: for aligning objects!**
- **Animation Player: a key part in the new animation suite enabling you to control QuickTime movies.**
- **Animation Tweener: a very simple system for controlling the movement of objects within the animation sequence – to be upgraded.**
- **Textures: offers limited control over texture direction, rotation and repetition. Includes controls for QT Movies applied as textures.**

PRICE	£600	**ON SALE**	Now	**CONTACT**	Adobe on 0131 451 6888	**WEB SITE**	http://www.adobe.com
MAC	**Processor:** 68020 • **RAM:** 8Mb	**POWERMAC**	**Processor:** any • **RAM:** 8Mb	**REQUIRES**	**System:** 7.0 • **HD space:** 80Mb • **Screen:** 640 x 480 • **Colours:** 256 •		
Extras: Floating Point Unit • QuickTime 2.0 • Two monitors recommended							

After Effects 3.0

Creating video special effects and titles can take time and be expensive. Colin Dalziel looks at two packages and asks, do they have the desired effects?



Most people think of special effects and impressive title sequences as being created purely for Hollywood extravaganzas, using a suite of computers costing more than the average detached house in the London suburbs. The truth of the matter is, special effects are accessible to anyone with a PowerMac on their desk and £600 to spend on software. Now that you know it doesn't cost the earth to produce effects, the question to ask is why would you want to do it?

With the flexibility QuickTime-based software offers, you can place animated sequences into almost any supported application, including multimedia authoring software such as *Apple Media Tool* and Macromedia's *Director* as well as presentation packages like Microsoft's *Power Point* and Gold Disk's *Astound*. Using these effects packages will really make your work stand out as professionally produced. And of course, if you use your Mac to produce videos, you can use these effects to the full.

What is AIFF?

Audio Interchange File Format – AIFF – is the standard file format for audio. This format is supported by all major programs, and you can create and edit sound files within it, using such software as *SoundEdit 16*, which was reviewed in MACFORMAT 36.

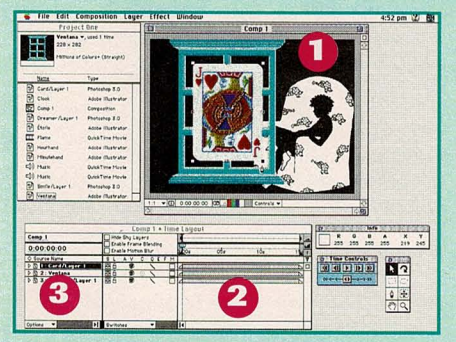
Getting started

After Effects is designed to work with two-dimensional images. Being an Adobe product, it supports the import of images from both *Illustrator* and *Photoshop* as well as QuickTime movies and AIFF sound files. To help you get the most from your *Photoshop* images, there is full support for layers (so you can see all the layers together in one image). This enables you to import multiple layered images and apply effects to single layers. At a basic level, you can produce simple animation where images or text files move across the screen.

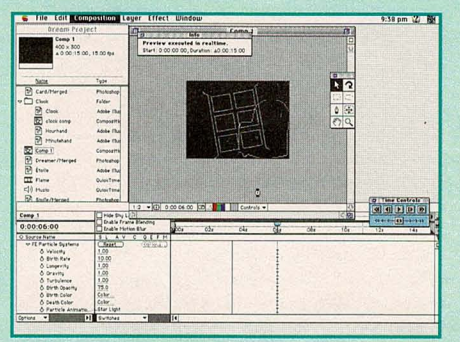
When you begin your first project, you work with a number of windows on the screen. The **Project Window** is the store for any imported "objects" (which may be images or QuickTime movies), and the **Composition Window** is where you place your objects and arrange their movement. When you place an object in the **Composition Window,** it appears in the **Time Layout Window** as a single layer. Each object in the composition is treated as a layer, and the order they appear in the **Time Layout Window** determines whether they will appear in front or behind other objects. The **Time Layout Window** is where most of the control over objects is applied – such as the speed of movement, their geometric properties and opacity. As the level of control is very precise, you need to master a number of operations. The process seems rather convoluted at first but, once you get used to the way things are assembled, you can achieve good results quickly enough.

Creating animation from still objects or text is a very straightforward job. You simply place the object in the starting position where you first want it to appear on the **Time Line,** and a click on the appropriate icon adds a KeyFrame (a type of marker, alerting your Mac that this frame is important, or a starting point). Move to the position in the **Time Line** when you want the object's movement to finish and place the object at its final position, again adding a KeyFrame.

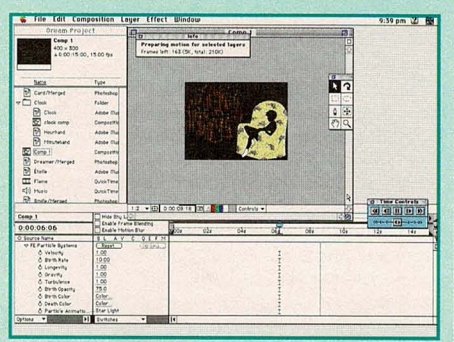
Monitor your progress



1. Composition Window, 2. Time Layout Window, 3. Project Window. The crowded



window arrangement makes a large or second monitor essential. Two preview options are



available – simple black and white outline view in real time or slow motion playback in full colour.

After Effects will automatically generate the positions in between, so that smooth movement appears.

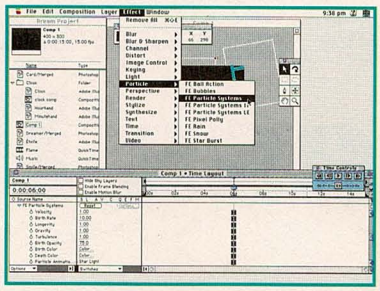
To make working with large projects easy, the package enables you to "nest" movies. This means you can work with many small sections and put them all together to produce the final movie. You will have to render the final project as a whole, but the complex process of assembling the project can be simplified.

You work on a project using low-resolution objects, so you can work in real time, moving objects around and changing their attributes without waiting for the screen to refresh. To achieve the final high quality movie you must render the project in high res. The rendering process can be quite time consuming – so you should try to have the project perfect before the final render. The preview option does give you a rough idea of how the movie will play, but it won't give a true representation of the final movie – rather a frame by frame slow motion preview. Bear in mind that you can't make any changes after rendering without having to re-render the full composition.

Alpha plus

All these basic features are fine, but what makes *After Effects* really worthwhile is the support for Alpha Channels. This feature gives you the ability to create effects and titles with transparent areas and backgrounds – meaning you can place your *After Effects* project above a movie and still be able to see the movie playing in the background. Perfect for generating titles and overlaying effects onto existing movies.

After Effects comes with a vast array of



Applying a filter is simply a matter of selecting the layer to enhance and finding the appropriate filter.

plug-ins for you to create some impressive effects. You'll find everything from simple blurs and familiar wipes to more complex colour effects, which can remove all the image area except for specified colours, and much more besides.

The effects do tend to centre on familiar filter types, found as standard with the last two versions of *Photoshop*. The effects are however given a new dimension thanks to the ability to apply them over time.

You can, for example, gradually make a **Lens Flare** appear out of the darkness or bring an image into focus by applying a blur filter and playing the sequence in reverse. If you want to get away from the standard range of filters you can use them in combination to produce hundreds of new effects.

An essential addition for anyone producing video effects is a second monitor – the usual set-up being one monitor to arrange the controls and one to preview and arrange the project.

The control of sound has been rather overlooked in terms of effects, but there is full support for CD quality output. As far as documentation is concerned, the manual is partly tutorial led and partly explanatory, which means you get a good grasp of the features of *After Effects* and how they work.

Once mastered, *After Effects* opens up a whole new range of possibilities for enhancing existing movies and presentations, while also enabling you to create new projects with ease – and further, to manage certain specialised filters and effects with a higher level of control than any other software at anywhere near the price. The support for plug-ins means that effects are likely to be made available in ever increasing numbers as movie technology improves on the Mac.

Alpha Channels

After Effects **contains a feature enabling you to produce Alpha channels. An Alpha channel is used, for instance in** ***Photoshop*****, to describe the parts of the image which appear as transparent rather than the background colour. For example, if you placed an image of a car on top of a landscape scene, you would be able to see the scene on the other side of the car through the car's windows.**

This also makes ***After Effects*** **very useful for tasks like adding titles or effects over the top of your movies.**

After Effects 3.0

Great features make *After Effects* a very cost-effective way to give your movies a professional touch.

Features	**86%**
Ease of use	**78%**
Documentation	**90%**
Value for money	**86%**

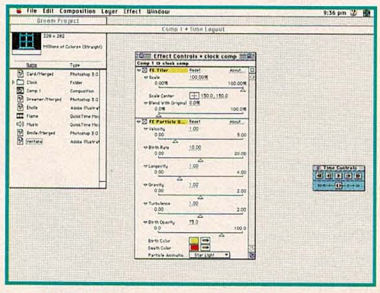
MF rating 83%

PRICE	£151	**ON SALE**	Now	**CONTACT**	Principal Distribution on 01756 704000	**WEB SITE**	http://www.principal.co.uk
MAC	**Processor:** 68020 • **RAM:** 6Mb	**POWERMAC**	**Processor:** any • **RAM:** 8Mb	**REQUIRES**	**System:** 7.0 • **HD space:** 20Mb • **Screen:** 640 x 480 • **Colours:** 256 •		
Extras: QuickTime 2.0 • After Effects 3.0 • 24-bit graphics card recommended							

Final Effects 3

Create stunning images with this plug-in for *After Effects 3.0*.

To get the most from your effects, you can't go far wrong with the addition of KPT *Final Effects*. This is a set of 28 filters, which are an add-on for *After Effects*. These effects are generally more imaginative and give you more control over your objects. For example, if you would like to vaporise an object, create rain or have objects disappear into a black hole, *Final Effects* is for you.



The level of control over the filters is amazing and sometimes a bit daunting.

The first time you use some of the filters can be a bit daunting, as most have multiple controls to configure. Part of the fun of learning the package is experimenting with the controls to create your own effects – and with so many variables it is unlikely that many of the effects will be repeated by other users.

One shortcoming of *Final Effects* is the sketchy manual, which only gives an overview of what each filter does, failing to explain how each can be adjusted to give the best results. Also, as *Final Effects* ships on a single floppy, there is no space to include examples of the stunning effects possible. To merely show still images in the manual does not do the program justice. A CD-ROM packed with sample movies and tutorials would go a long way towards making this effects package unbeatable.

However, there is no doubt that in the same way that Kai's *Power Tools* unleashes a new dimension for *Photoshop*, *Final Effects* sets *After Effects* free for you to create stunning movies. **MF**

Final Effects 3

The additional cost of *Final Effects* is well worthwhile, as this collection of plug-ins really takes *After Effects* to new heights.

Features	**92%**
Ease of use	**80%**
Documentation	**75%**
Value for money	**86%**

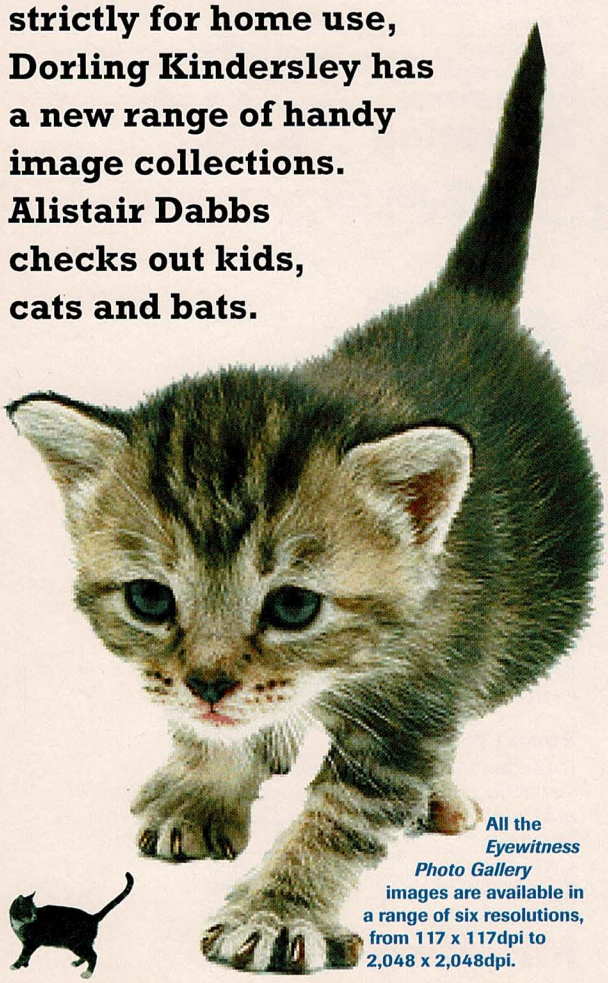
MF rating 87%

PRICE	£9.99 each	**ON SALE**	Now	**CONTACT**	Dorling Kindersley on 0171 753 3488	**WEB SITE**	http://www.dk.com
MAC	**Processor:** 68030 • **RAM:** 4Mb	**POWERMAC**	**Processor:** any • **RAM:** 4Mb	**REQUIRES**	**System:** 7.0 • **Screen:** 640 x 480 • **Colours:** 256 • **Extras:** CD-ROM drive		

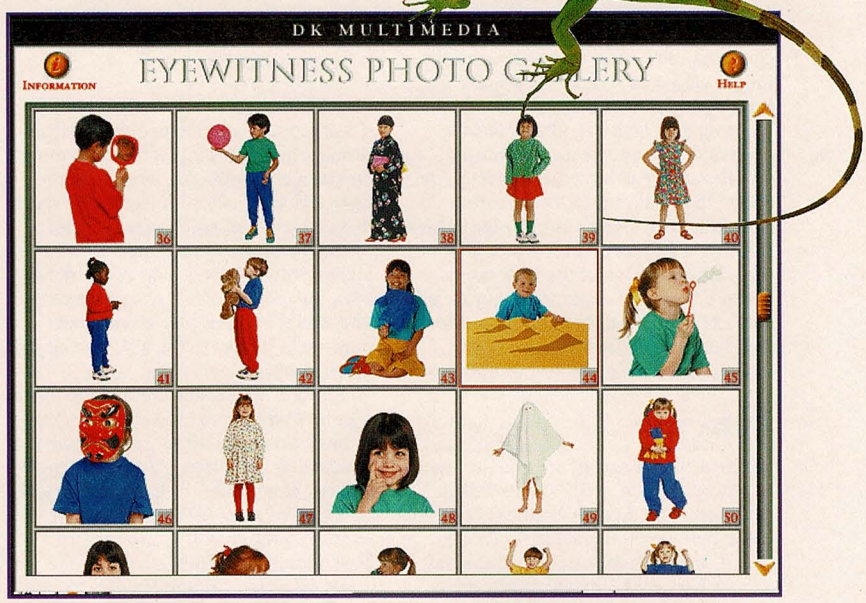
Eyewitness Photo Gallery

Cats
Birds
Wild animals
Children

If you're looking for clip photos strictly for home use, Dorling Kindersley has a new range of handy image collections. Alistair Dabbs checks out kids, cats and bats.



All the *Eyewitness Photo Gallery* images are available in a range of six resolutions, from 117 x 117dpi to 2,048 x 2,048dpi.



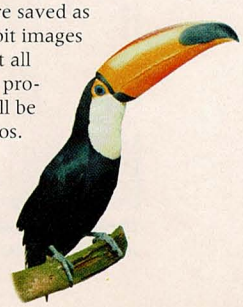
Eyewitness Photo Gallery's interface looks more like that of a multimedia title than an image browser, and sadly, it runs just as slowly too.

If you've read Dorling Kindersley's many best-selling hardback books or played its multimedia titles you'll be familiar with the "DK look": crisp and colourful photography on cut-out white backgrounds. Now the publishing company has decided to open up its image vaults and make the photos themselves available to the domestic Mac owner.

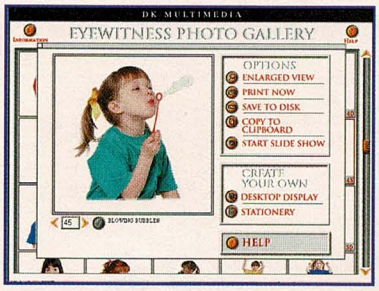
The *Eyewitness Photo Gallery* is a range of single CD-ROM packages, each available separately and containing 100 of DK's own images with an integrated browser. We took a look at the first four volumes to be released: *Cats*, *Birds*, *Wild animals* and *Children*.

The images are just great, and while the browser is clumsy and incredibly slow, it does provide a nice-looking way to select what you want and copy it to your hard disk in one of six resolutions from 117 x 177 to 2,048 x 2,048. The system of image extraction from the CD is a bit bizarre, however, with the top resolution files of up to 3Mb in size taking ten minutes or more to copy over. After trying this several times and watching the Mac crash as the browser hit its own hard-wired 4Mb memory allocation, I ended up just hunting through the cryptic filenames on the CD without the help of the browser and then copying the files by holding down **[option]** and dragging them onto the Desktop. They are PNG files (a new Mac file format, intended as a successor to GIF), which we opened in well under a minute using *GraphicConverter*.

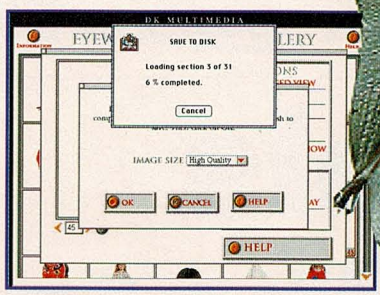
Despite some obvious dust and scratches on certain images at high resolution, the scans are of generally fine quality. No *Photoshop* floating selections or layers have been saved with these files, but they have been cut out from pure white backgrounds, which helps. The choice of file formats you can save to – PICT, TIFF, PNG and "bitmap" – is reasonable but not extensive, and only the high-res versions are saved as full 24-bit images in millions of colours. But all this is academic, since no professional graphic artist will be making use of these photos. You see, DK expressly forbids their commercial use in the licence.



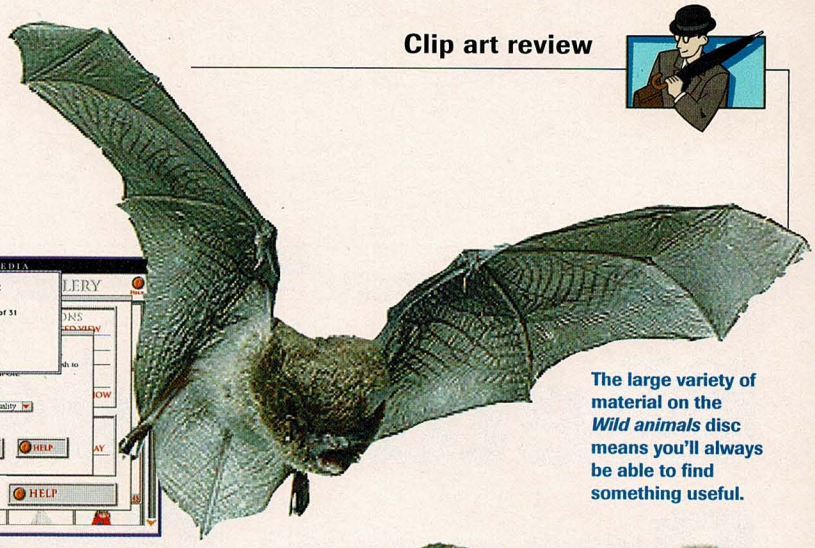
So what are the CDs for? They are aimed at



Click once on any thumbnail, and a window of choices eventually appears. Getting high-res images from the CD and on to your Mac can be trickier.



This is what you see when you try to save a photo to your hard disk at high resolution. What it's doing, we don't know, but it takes an extremely long time.



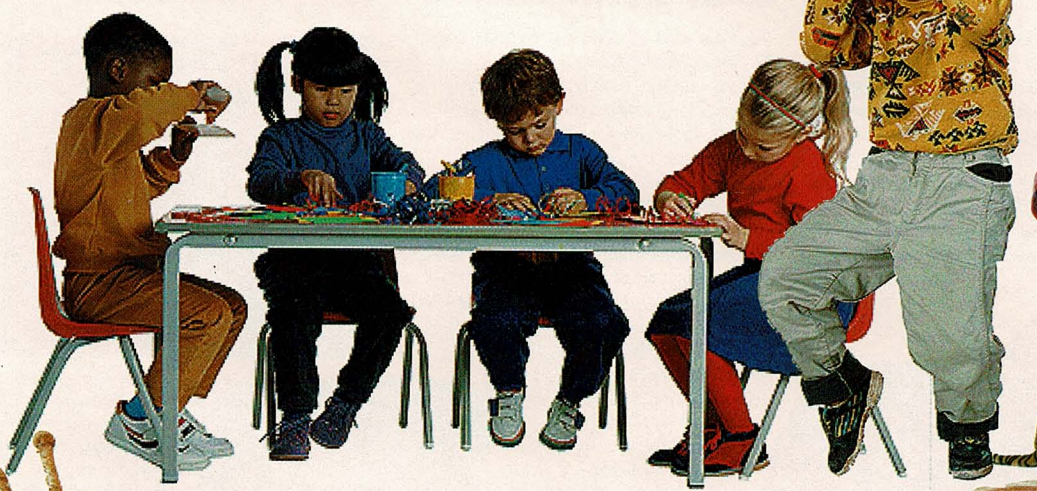
The large variety of material on the *Wild animals* disc means you'll always be able to find something useful.

youthful home users and schools who want to produce greetings cards, calendars, little newsletters, T-shirts, Desktop Patterns and so on. This explains the over-friendly browser and its unusual features such as enabling you to print sheets of A4 with your chosen photo at the top. Exactly where schools might stand with regard to using the photos in reports and prospectuses might require some investigation with DK, but if there's one thing that DK handles well, it's after-sales customer and technical assistance.

It's almost a tragedy that commercial designers are denied permission to use these charming volumes, though quite how useful you might find 100 pictures each of birds and cats is open to debate. But the licence restriction is reflected in the very low price, so cost-conscious parents will be happy. **MF**

MF ratings

Volume 1 Cats	**75%**
Volume 2 Birds	**75%**
Volume 3 Wild Animals	**80%**
Volume 4 Children	**80%**



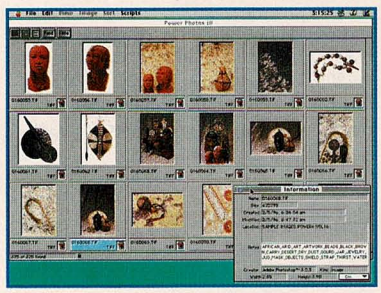
It's a shame that the licencing restrictions prevent you from using any of these images on a professional basis.

All the images in the collections are accurately cut-out and conveniently presented on a white background.

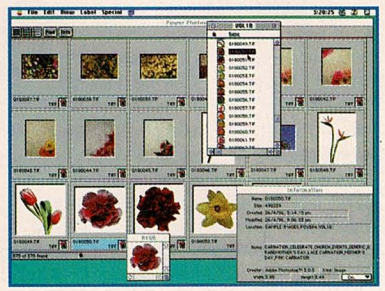
PRICE	£151.60	**ON SALE**	Now	**CONTACT**	Principal on 01706 832000	**WEB SITE**	http://www.metatools.com
MAC	**Processor:** 68000 • **RAM:** 4Mb	**POWERMAC**	**Processor:** any • **RAM:** 4Mb	**REQUIRES**	**System:** 6.0.7 • **HD space:** 30Mb • **Screen:** 640 x 480 • **Colours:** 256 • **Extras:** CD-ROM drive		

MetaTools Power Photos IV

The problem with bringing out more and more clip art collections is finding new subjects matter for them. MetaTools might seem to be beginning to struggle, but the quality of this fourth copyright-free selection remains high.



At the most basic level, you'd use the Kudo browser to look at thumbnails, but you can hunt down any image by keyword across a browser for all four *Power Photos* packs.



Kudo can even be used to call up the associated thumbnail in the Finder, but this isn't much use since the actual photo you want is on another CD entirely.

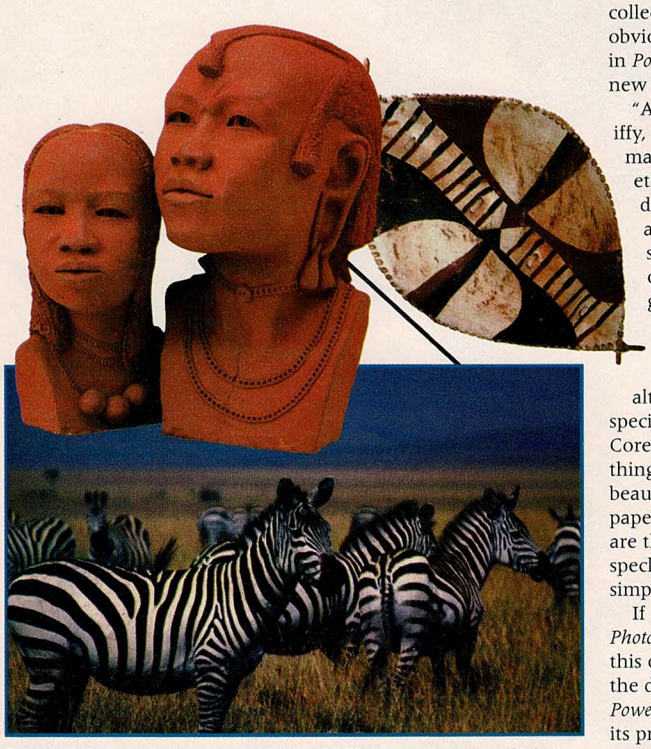
The latest in MetaTools' series of five-CD packs of clip photos, *Power Photos IV* tries hard to find five new useful categories for graphic designers, and very nearly matches the originality of the previous three sets. A sixth CD-ROM is supplied containing the Kudo browser and indexed thumbnail catalogues covering this and all three previous *Power Photos* collections.

As a creative resource of 375 top-quality, high-resolution photographic images, *Power Photos IV* cannot be beaten. Not only are the scans of unequalled cleanliness, but they are saved as *Photoshop* TIFFs, often including the smoothest clipping paths you will ever see, for perfect cut-outs every time. But with earlier collections having covered all the most obvious topics already, the CDs included in *Power Photos IV* don't all come across as new and universal concepts.

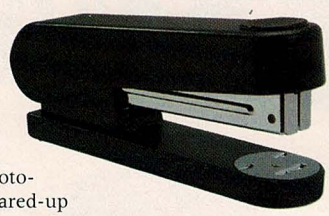
"Africa", especially, is very iffy, and it's possible that many of the right-on ethnic art objects will be dumped in favour of the animal skins – thankfully still attached to their original owners when photographed. The endless squared-up shots of shrubs and trees in the "Flowers" and "Fall Foliage" volumes verge on the tedious, too, although they could be invaluable for specialist work. Much better are the Corel-like "Business Elements", covering things like office staplers and some beautiful coloured textures made up of paper clips and rubber bands. Best of all are the "Paper Textures", ranging from speckled card to cartridge to wool – simply wonderful.

If you've been collecting the *Power Photos*, you'll find plenty worthwhile in this one, although be warned that – like the dull new square CD box it comes in – *Power Photos IV* isn't quite as original as its predecessors.

ALISTAIR DABBS



Some of the artefacts covered in the "Africa" section are a little obscure, but the animal photos and textures are superb.



All the images on the CDs are completely copyright free – now you can do clever things with paperclips at no extra cost!

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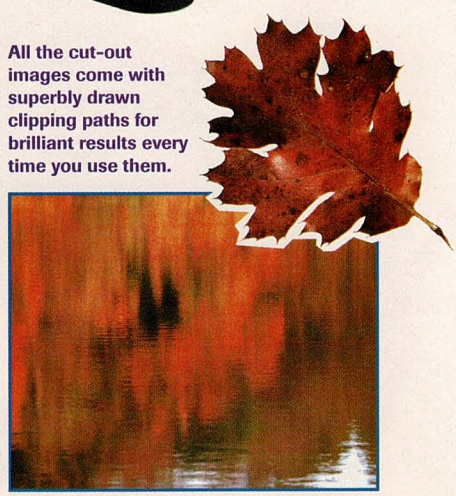

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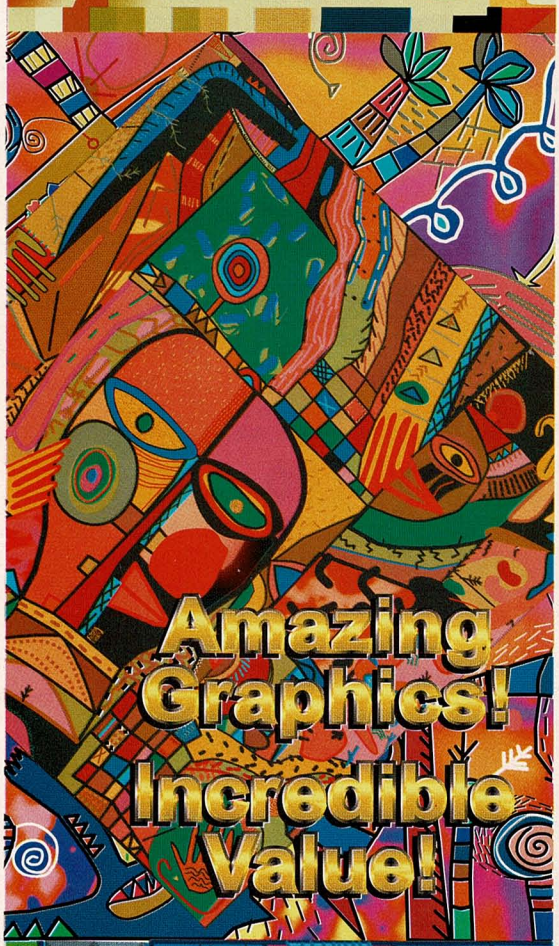

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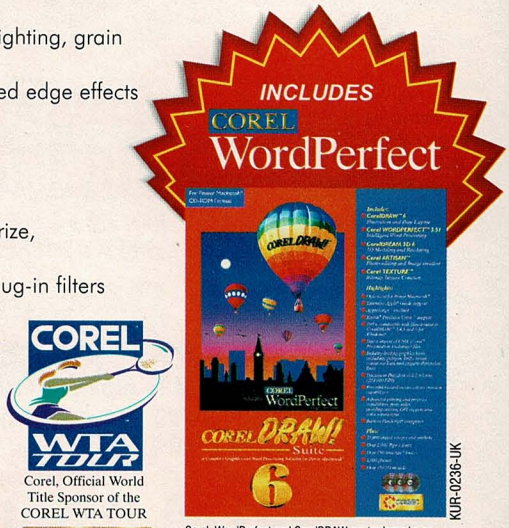

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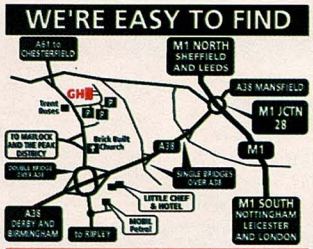

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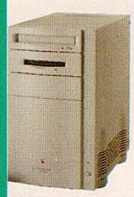

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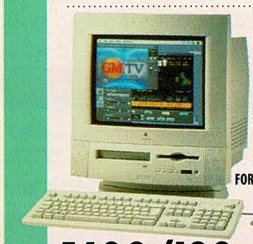

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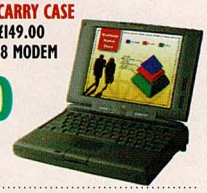

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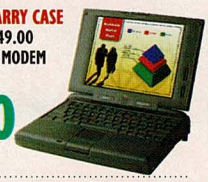

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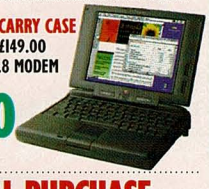

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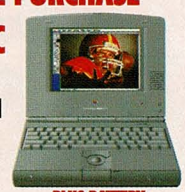

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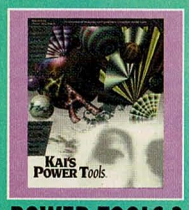

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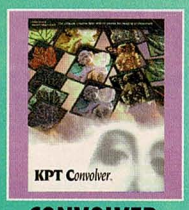

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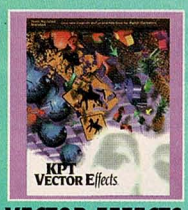

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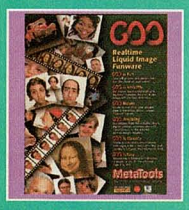

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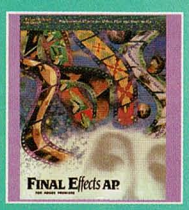

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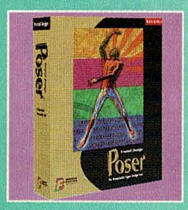

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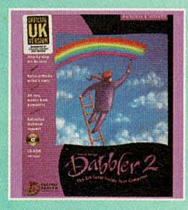

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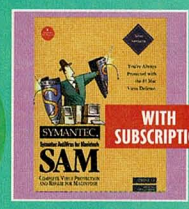

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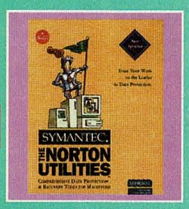

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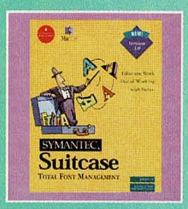

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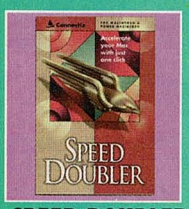

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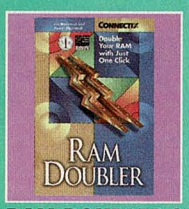

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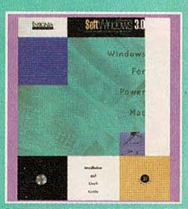

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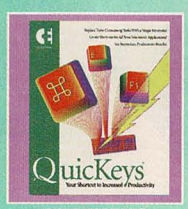

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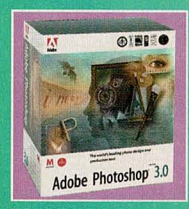

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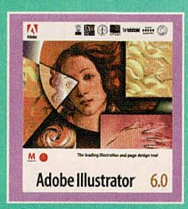

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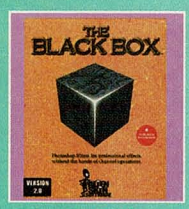

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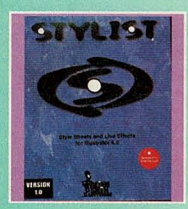

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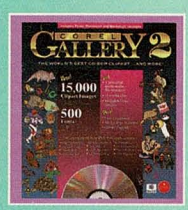

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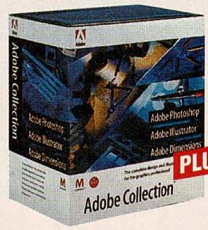

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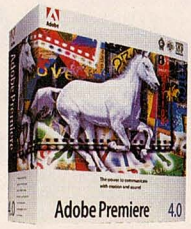

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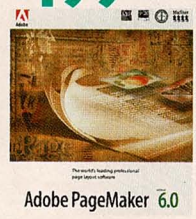

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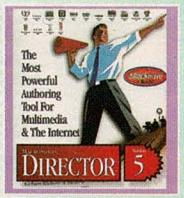

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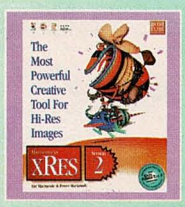

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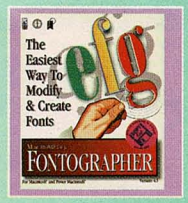

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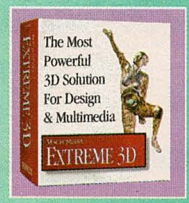

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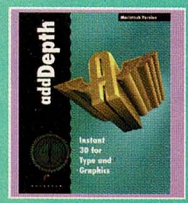

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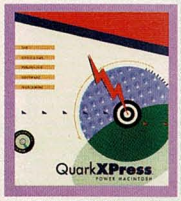

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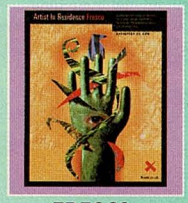

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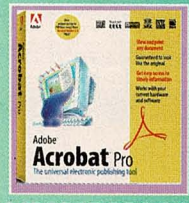

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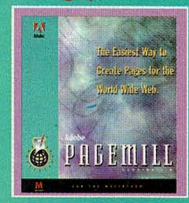

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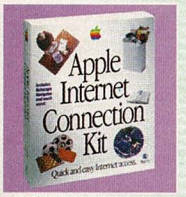

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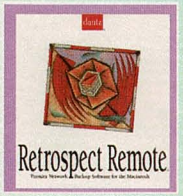

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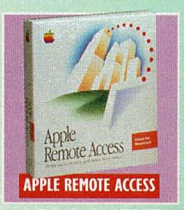

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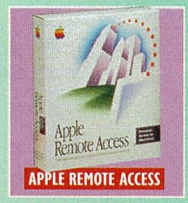

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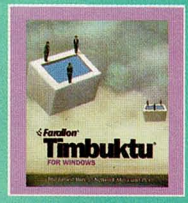

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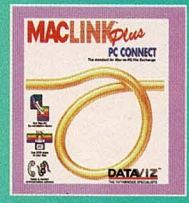

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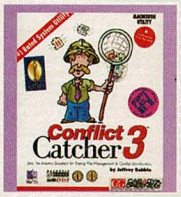

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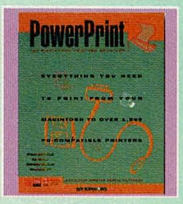

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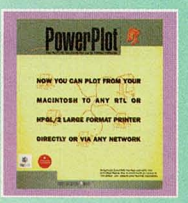

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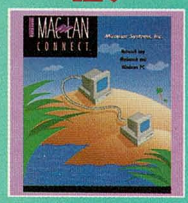

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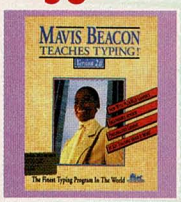

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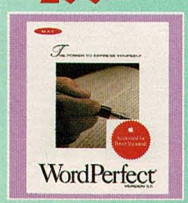

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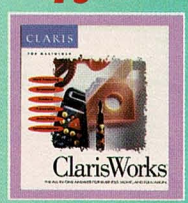

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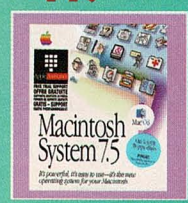

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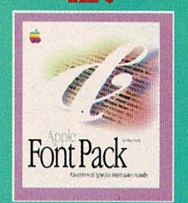

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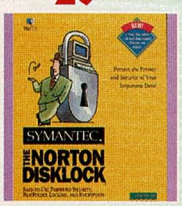

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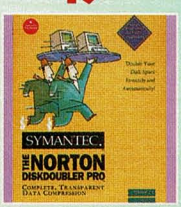

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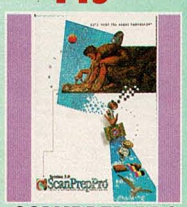

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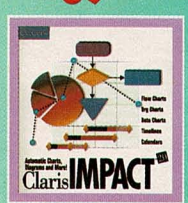

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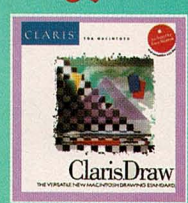

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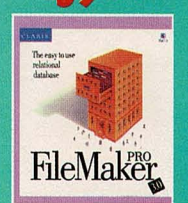

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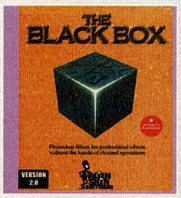

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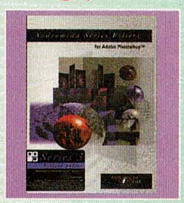

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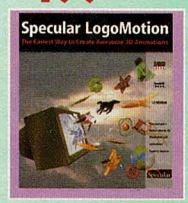

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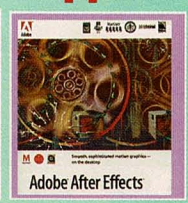

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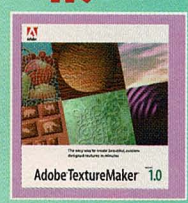

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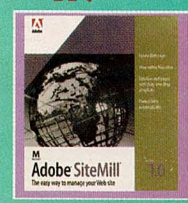

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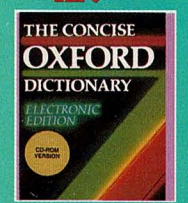

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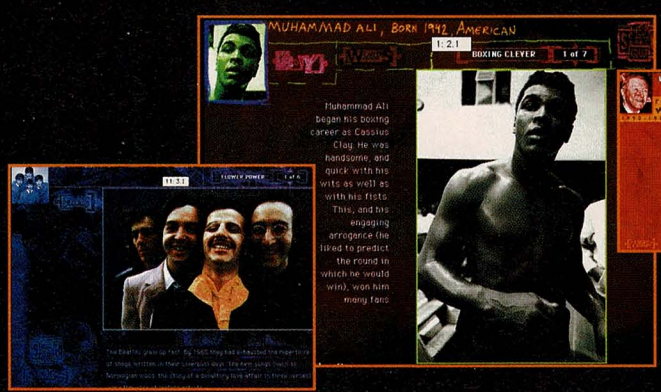
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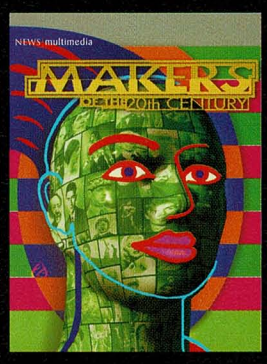

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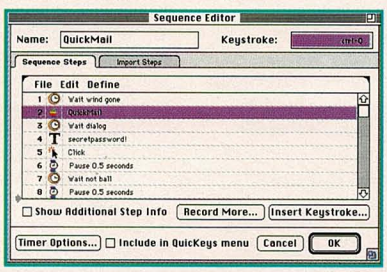
QuicKeys 3.5

Do you fancy replacing a whole morning's work with a single keystroke? Can computers really make your life easier, or is it just destined to be more complicated than that? Click here...

My grandmother always used to tell me that there's no such thing as a shortcut – but it never stopped me forcing my way through a gap in the school fence to save a few minutes' walk. CE Software is demonstrating the same bravado in the face of grandmotherly wisdom by offering a new version of a program that promises to replace all manner of tedious tasks on your Mac with either a few keystrokes or the press of a button.

QuicKeys consists of an Extension and a pop-up program enabling you to record what it calls "shortcuts" (anyone else would call them macros). The real power lies in combining individual shortcuts into a "sequence". In theory, anything you can do with your Mac (except throwing it out the window when it crashes) can be reduced to a single command. These automated lists can then be activated whenever you need.



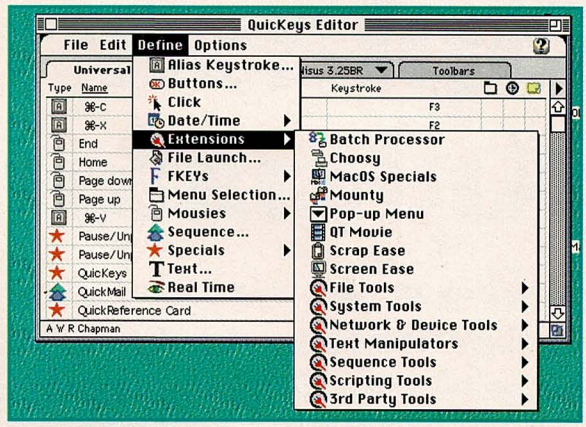
A recorded "sequence" broken down into its individual "shortcut" components. This makes it easy to edit your sequences.

You can save a shortcut either in the **Universal set**, meaning that it will perform the same task or tasks in the Finder and in whatever application you're running, or in separate **Application sets**, grouping together shortcuts that you can only perform when the appropriate application is running. You could have a shortcut working in your favourite word processor, for example, to type in your name and address or even an entire standard letter and then print it out.

All these sets, sequences and shortcuts are managed by the pop-up *QuicKeys Editor*. If you are recording a single shortcut, the program expects you to define it according to a list of shortcut types. There's a whole host of these, with the potential to add more through the *QuicKeys* Extensions system, or by importing a set from another source. Developer CE Software seems to envisage people meeting their friends to swap *QuicKeys* shortcuts like kids in the playground with football cards.

Specified shortcut types include launching a file (handy if you're not there to double-click on a file or an alias) or replacing mouse controls for resizing a window, say. Other types can be used for scrolling though a document, for typing in a chunk of text, or for a variety of output and networking options. (These latter are *QuicKeys* Extensions, and they have the rather cheesy names of **Choosy** and **Mounty**.)

There are so many different shortcut types that it can all become confusing. Thankfully there's the easy **Record Sequence** option, accessible directly from the *QuicKeys* menu (resident in your menu bar once the application has been installed). Just start *QuicKeys* recording and everything you do – keystrokes, mouse clicks, menu selections, the lot – is saved until you stop it. Made a mistake? No problem: you can view your sequence and edit it afterwards.



The range of shortcut types you can define in *QuicKeys* is huge – and confusing. Luckily, you can just record a sequence of actions.

To launch (or play back) a shortcut, you can choose from a range of no fewer than seven methods. You can define a keystroke (but do avoid any combination already used, like **[command] S**), select the shortcut from the *QuicKeys* menu, click a button on a user-defined toolbar – or even speak the shortcut's name using Apple's PlainTalk speech recognition system on a PowerMac or AV Mac: we yelled "Rubbish!" at our Mac in the style of Victor Meldrew, and the program duly tipped a selected batch of files into the Wastebasket. Great fun.

Sometimes, you'll feel that *QuicKeys* is offering facilities you may already have – Drag and Drop printing, for example, or launching an application on Startup. It would also be handier if you could save sequences as stand-alone applications, independent of *QuicKeys*. But it can be a big time-saver for batch-processing lots of files or automating repetitive tasks. A bit of a luxury, perhaps... but indulge yourself anyway. **ANDREW CHAPMAN**

Working demo available in the Demos folder

Play it again

We took a detailed look at the art of writing your own AppleScripts in MACFORMAT 32, 33 and 34. If you missed any of these issues, turn to page 134 for details of our back issues service.

Same old script?

If all this sounds familiar to you as an expert Mac user, it's because *QuicKeys* works on much the same principles as AppleScript. AppleScript enables you to record frequently-undertaken tasks and set them in operation by running a "script" – basically a list of commands that you've automated. There are two significant advantages to AppleScript: one is that it's free with System 7.5, and the other is that it enables you to save scripts as independent applications. This gives it potential as a programming tool.

AppleScript's major disadvantage is that it only works with applications that are "scriptable" – *Word*, *Excel* and *QuarkXPress* are, for example, but plenty more aren't. *QuicKeys*, on the other hand, works with any application. Also, AppleScript is not exactly user-friendly – writing your own scripts can be a complicated business. For more information on scripting, check out the margin note.

QuicKeys 3.5

A luxury, but unarguably – and beguilingly – useful if you can spare the money.

Features	**76%**
Ease of use	**83%**
Documentation	**70%**
Value for money	**59%**

MF rating 71%

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MAC	**Processor:** 68030 • **RAM:** 8Mb	**POWERMAC**	**Processor:** any • **RAM:** 8Mb	**REQUIRES**	**System:** 7.5 • **HD space:** 10Mb • **Screen:** 640 x 480 • **Colours:** 256 • **Extras:** 2x speed CD-ROM drive		

Future Splash Animator

Moving imagery in small files, so they download quickly... unbelievable? A new animation package aimed at the Web claims to do this and more...

File Edit View Format Tools Object Play Library Window
7 Optimizing Animation
FUTURE Splash ANIMATOR
CONTENTS
NEXT
Optimizing Animation
Small, fast files are important for a Web site. This lesson explains how to create the most optimized FutureSplash™ Animator files.

Future Splash Animator's **work area is the large window, and the top one shows the different layers of animation. (Some excellent tutorials are included.)**

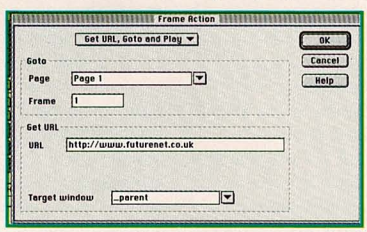
Text can be manipulated in the same way as any other object.

Once upon a time, Web sites were simple things to behold, composed purely of text and the odd image. But these days, Web sites are turning into spectacular multimedia events, with sound, animation and all manner of audio-visual effects. FutureWave's *Future Splash Animator* is the latest recruit to this revolution, and a bright one at that.

ON THE CD

Working, time-limited demo in the **Demos** folder.

New technologies, such as Adobe's *Shockwave*, enable Web site designers to create these stunning multimedia spectacles using the same programs that are used to create CD-ROMs. Another common technique used is animated GIFs, which are standard GIF files that contain multiple images. However, wonderful though these creations may be, they do take time to download – and time is one thing that most Internet users don't have. It's all a question of file size – the bigger the file is, the longer it takes to download. But FutureWave thinks that its new program could help with this.



Setting up a link to an appropriate Web site is easy enough.

Future Splash Animator can create animations, but the files produced are much smaller than animated GIFs. For instance, the animation shown on this page, which included scrolling text and plenty of movement, was 3Mb when saved as an animated GIF file. However, the *Future Splash* version was only 43k – a pretty significant reduction.

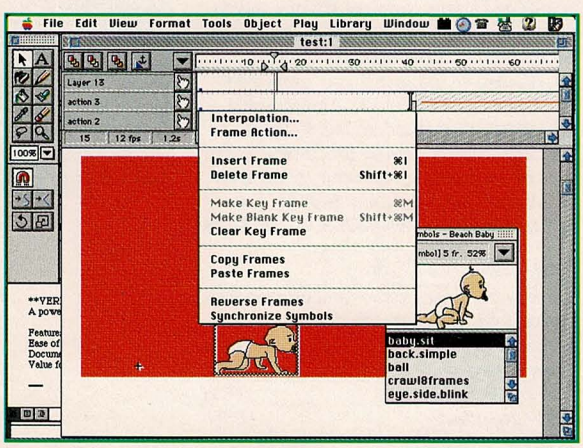
Future Splash Animator is extremely powerful, but is not very user-friendly. You can't type in some text and animate it at once – you have to convert the text into what the program refers to as an "object" before you can animate it. Nevertheless, this approach has its benefits; an object can be anything from a bit of text to a vector-based drawing created within the program.

Once you grasp the way the program works, it's also easy to animate things. They can be scaled, spun, morphed (as long as they are vector-based) and thrown around in a number of ways.

But there is more to this program than just animation. You can easily give the animations an interactive element – moving the mouse over the image can start off another animation, load a file or even take you to another Web page.

Well, this all sounds wonderful, so what's the catch? As per usual, there is one, although it's not a big one. Your browser can't simply load the files produced by *Future Splash* and run them – they aren't in a standard file format such as GIF or JPEG. Instead, the browser needs a separate program to run them – the *Surf Animator* plug-in. If this isn't installed, the user has to install it, restart the browser and then access the page. The plug-in is freely distributable, so you can stick it on your Web page and let others download it – but it's still a pain. The uncompressed plug-in is around 120k, so it takes a while, too.

However, it's worth downloading. The animations it produces can be created as standard animated GIF files (which *Future Splash* can create), but they are significantly smaller when saved in *Future Splash* format. Also, the other stuff can't be done with an animated GIF. You can do it with *Shockwave*, but using *Shockwave* for relatively simple things is like using a sledgehammer to insert a floppy disk – it's a bit of a heavyweight for the job. Having to download and install the plug-in is a pain, but it's worth the grief. Expect to see content created by *Future Splash Animator* on a lot of pages in the near future. **BILL BOW**



The interface is confusing, with many menus all over the place.

Future Splash Animator

A powerful animation system that produces compact files, which can even be interactive, but it is a bit of a fiddle to use.

Features	**90%**
Ease of use	**70%**
Documentation	**80%**
Value for money	**84%**

MF rating 82%

JPEGs & GIFs

JPEG (named after the Joint Photographic Experts Group): a compression format that reduces your image without losing too much detail.

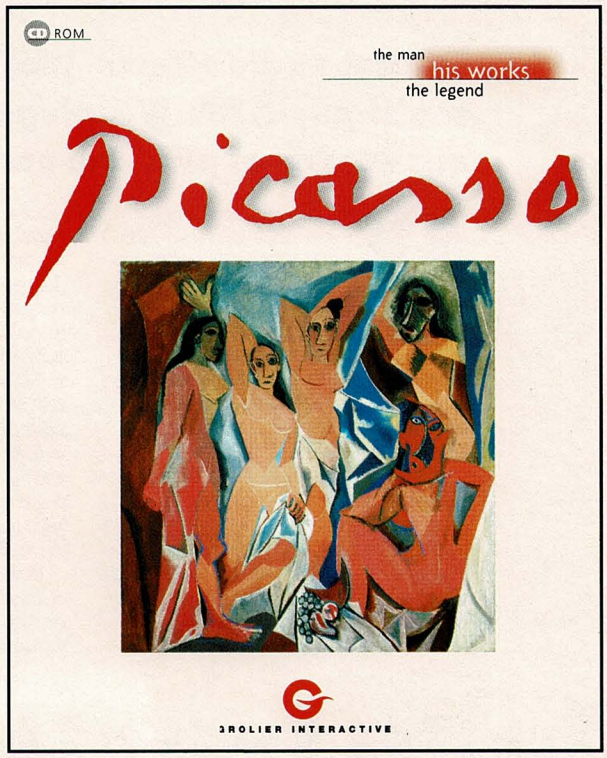
GIF (Graphics Interchange File): the GIF format also compresses files, although the quality is not as good as the JPEG format.

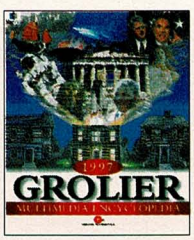
Press approved !

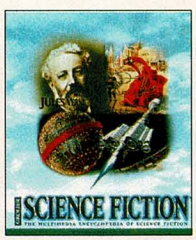
CD ROM

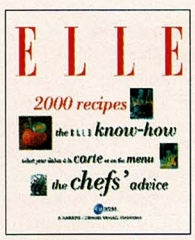
«It's huge and very impressive... this splendid multimedia captures the very spirit of Picasso himself!»

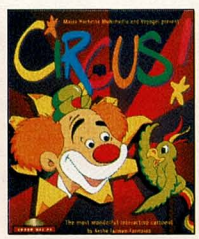
CD ROM MAGAZINE

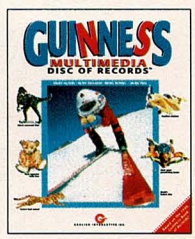












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Suite dreams

Digital audio effects, like beers, are often more welcome in a multi-pack. Ian Waugh gets more for his money in part three of our survey of plug-ins and stand-alone sound editing software.

Over the last two issues we've been surveying the world of digital audio – audio processing software that many professional studios use to edit digitised sound and music.

You might want to use this kind of software to create a sophisticated backing track to your own musical performances, say, or provide the soundtrack for a multimedia project.

There's a huge range of audio processing effects available, enabling you both to rearrange your digitised sounds – to create smooth continuous loops, for example – and to edit the actual qualities of the sound itself, reducing unwanted hiss or altering the amplitude.

The three most popular digital audio processing applications are DigiDesign's *ProTools* (which uses the Time Division Multiplexing system, known as TDM to the professionals who use it), *Sound Designer II (SDII)* and *Adobe Premiere*. Added to these you will most probably want to use a variety of plug-ins, and we've surveyed a whole range of different plug-ins for different effects. Back in MACFORMAT 43, we began with a look at plug-ins for equalisation, reverb and spatialisation effects. (Not sure what these terms mean? Best start with a look back at that issue – if you missed it, turn to our back issues service on page 134.)

Last issue we looked at the wide range of functions covered by dynamics processing as well as rounding up a corral of useful utilities.

You don't always have to use one of the "big three" packages with plug-ins, though: there are also numerous stand-alone audio processing programs available, and we've covered the best of those, too.

This month, we're looking at both plug-ins and stand-alone packages that offer a variety of functions for one price.

In each section we've selected certain titles for a more detailed review so you can see the sort of features these types of programs have and how they perform. However, as ever, it's good practice to try before you buy (many, but not all, companies make demo versions of their software available) and make sure you buy the software or plug-in which is compatible with your system.

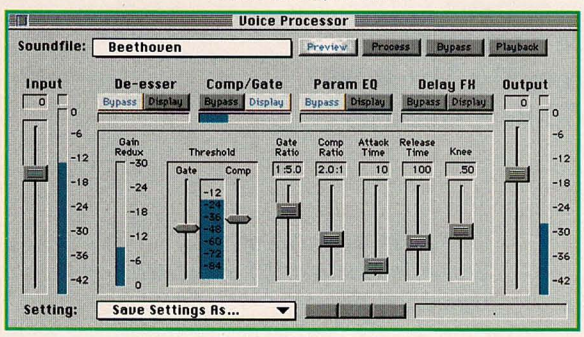
Multi-function software

One of the best ways to get a lot of features for your lolly is to buy software which contains more than one function. Although some of these are more expensive than a single plug-in – as you'd expect – the difference in price is often not as great as you might think and there are some real bargains to be had.

Here are some suites which offer a variety of effects and functions – two of the stand-alone programs are also available as TDM plug-ins, and there are various collections of plug-ins which can again offer considerable savings on buying them separately.

JVP

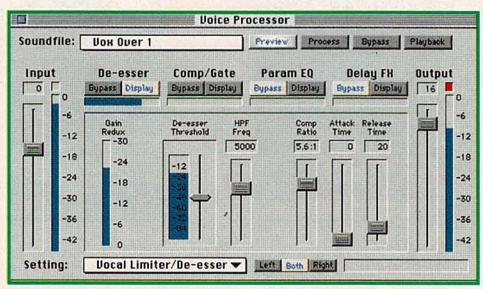
TDM plug-in, £430.05
Stand-alone, £344.28



JVP has a similar set of controls for all four effects. Here you can see the de-esser doing its stuff (see Jargon Busters).

Unity Audio

JVP (Jupiter Voice Processor) is named after Jupiter Systems, which originally wrote the software, and contains four effects – a **de-esser**, a **compressor/gate**, a **parametric EQ** and a **multi-tap delay**. Although the effects are particularly useful for processing vocals they are by no means limited to this and are suitable for use with a wide range of sounds.



The Compressor indicator in the Voice Processor kicks in when a signal is being compressed so you can see how the settings affect it.

The **De-esser** uses special filters to attenuate sibilants more selectively. The **Compressor** has a good range of control settings and visual indicators so you can see as well as hear what it's doing. The **EQ** section contains five filter types – low pass, low shelf, peak/notch, high shelf and high pass. The **Multi-Tap Delay** has six separately-adjustable delays, a comb filter and adjustable feedback.

The interface is pretty basic, with sliders but no graphics to represent sound forms. But the software is easy to use, and you get a lot of control over the settings, which can be saved for instant recall. A few presets are supplied but more would have been nice.

The program uses a hard disk install as copy-protection, although you can run it without installing it by inserting the master floppy. The manual is excellent and explains exactly what the effects do and how to go about using them. Ten out of ten here.

JVP is a moderately-priced and easy-to-use package offering four high-quality and powerful effects.

JVP

MF rating 88%

Audio Track

TDM, SDII or Premiere plug-in, £229
Natural Audio

All of *Waves*' plug-ins use a dongle (a hardware "plug-in") called a WaveKey. This programmable device can be updated to authorise several *Waves* products. It allows you to run several plug-ins using only one dongle, and you don't have to worry about losing the

hidden software authorisation code on your hard drive that most music software uses for copy protection – sometimes this code can be lost if your Mac crashes.

The installation routine for any of the plug-ins, however, is rather involved. You must create a separate folder for the *Waves* plug-ins and install the correct *WaveShell* program in the plug-in folder of the application you want to use the plug-ins with. You may also need to run the WaveKey utility to check your dongle's authorisation. Still, once it has all been sorted out, it can make life a good deal simpler.

AudioTrack puts three of the most commonly-used effects into one window. The **four-band Equaliser** (EQ) has a graphic display, and you can create EQ effects by dragging the curve around the screen – an excellent feature. You can also switch each band on and off independently.

The **Compressor/Expander** has four controls; while this is not as many as some compressors have, it does at least make the settings easy to adjust. Although it doesn't have the range of some compressors, it is still a useful tool for many applications.

The **Noise Gate** controls are similar to the Compressor/Expander controls. It can help to remove low-level noise from a recording by letting sound through only when it reaches a designated volume level.

The **Output** indicator is worthy of mention, too, because it not only warns you if clipping occurs, but it also tells you if it's due to boosted EQ frequencies or simply an output set at too high a level.

The manual is helpful and runs through a few effects basics before getting down to the program's operation. Perhaps *AudioTrack* doesn't contain the effects everyone would like to see in a three-pack, but it's reasonably priced and functions well.

AudioTrack

MF rating 84%

ToolBelt

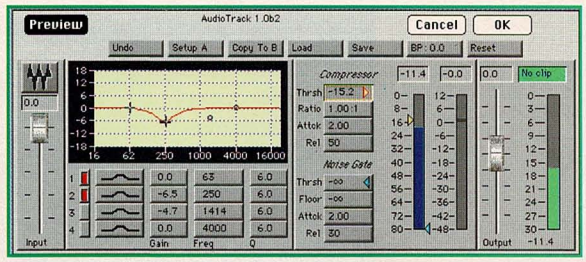
TDM £327.83
Synchro Arts

A multi-function effects set. Copy-protection is by way of a verbal authorisation for which you must call Synchro Arts.

There are three main effects plus two ancillary effects. Control is from a central window with four tabs for selecting the In/Out routing and the effects.

The ancillary effects are **reverse** and **invert** (a 180-degree phase shift), both of which are selected on the In/Out page. You can manipulate stereo channels independently and select single or multi-effect processes.

TimeMod is a non-real-time time compression/expansion effect (if you see what we mean). Its range runs from 0.5 to 2, so it can double or halve the speed of a sample. The result is quite clear and the process doesn't introduce any unwanted noise into the recording.



***AudioTrack* runs within *Adobe Premiere* and *Deck II* as well, and works in pretty much the same way, apart from a few minor cosmetic differences.**

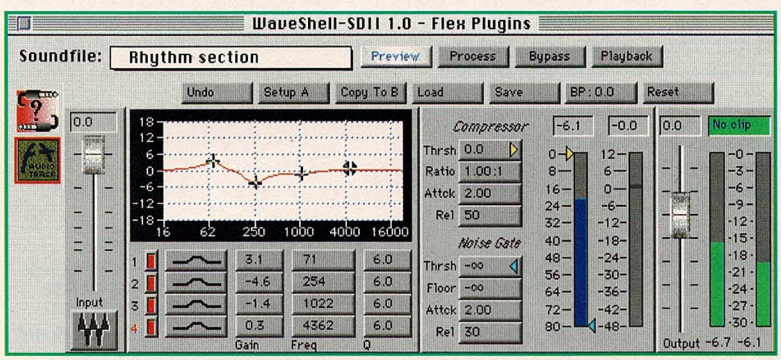
Power Looping butts the end of a sample to the beginning and lets you visually or numerically adjust the two points. It's the best way to construct loops manually but an automatic loop finder function would be even better.

The **Audio Generator** is unique as far as I'm aware. It uses chaos theory to generate natural-sounding audio from samples as short as 0.1 seconds. The controls are similar to Power Looping. It outputs an audio file of the required length, which sounds more natural than simply looping the segment. It works best with background sounds, atmospherics, water, applause and so on. Interesting.

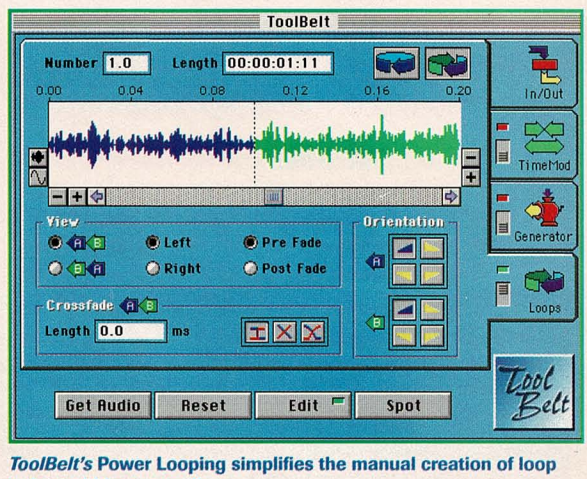
Operation is just a tad numeric in places and you have to hit hot keys to perform many functions including play-back. It works extremely well within ➤

Reverb-verb-erb

Reverb is the cornerstone of any effects set-up, and can add ambience, depth and warmth to a sound. The wide range of parameters used to create this effect also help to lend a sense of "space" between you and the sound source.



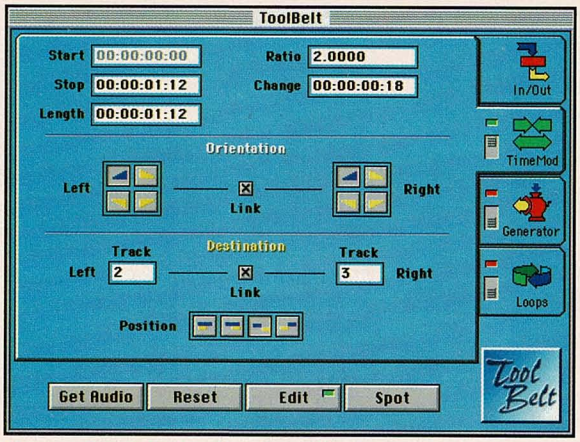
***AudioTrack* offers three of the most used effects, all controlled from the one window.**



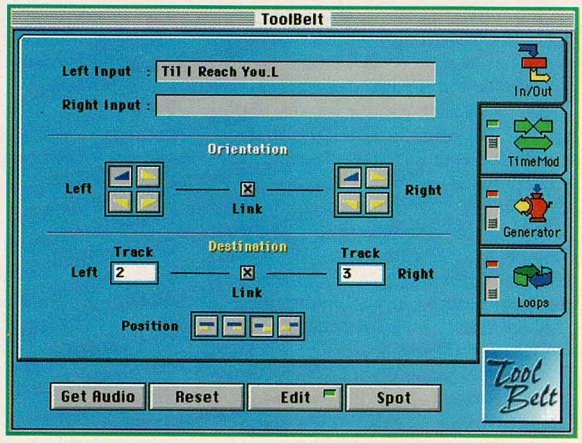
***ToolBelt's* Power Looping simplifies the manual creation of loop points within a recording.**

Jargon Busters

- **Comb filter:** this delays the output of the sound signal to produce a phasing or "flanging" effect.
- **Compressor:** this reduces a signal's dynamic range. It's a little like an automatic fader: when the volume of the music rises, the compressor fades the level down, and when the volume drops, it brings it back up. It's very useful when adding sounds with a wide dynamic range, such as vocals – without a compressor, the vocals may get lost in some parts of the mix and drown out other parts. It's also useful for evening out the dynamic range of a complete piece before you master it.
- **De-esser:** a filter to remove sibilance – that is, noises like "ss", "ch" and "sh" which are often accentuated during recording and sound unnatural and irritating.
- **Expander:** the opposite of a compressor – it increases a signal's dynamic range. Can reduce background noise and breath sounds.
- **Filters:** there are five main types of filter. Low Pass lets through low frequencies and High Pass lets through high frequencies. Low Shelf and High Shelf filters are often used to raise or lower a whole region of the tone spectrum. A High Shelf filter, for example, cuts and boosts the higher frequencies. Peak/Notch filters shape a selected area of the sound spectrum, a little like a Parametric EQ.
- **Graphic EQ:** an equaliser with a number of cut and boost controls, each of which affects a specific frequency. These are often presented on your screen as sliders, so the pattern of the sliders shows the frequency response of the equaliser.
- **MIDI:** Musical Instrument Digital Interface. The standard system for connecting music equipment to your Mac, and a music file format, including instrument descriptions, that most programs can play back.
- **Parametric EQ:** a type of equalisation which enables you to select a frequency and cut or boost the spectrum around it.
- **Pitch-shifting:** changing the pitch of a sound without affecting its duration.
- **Time-stretching:** changing the duration of a sound without affecting its pitch.



You can stretch the duration of your files by a ratio of up to two or compress them by a ratio down to 0.5, using *ToolBelt's* TimeMod.



The In/Out tab in *ToolBelt* enables you to select reverse and invert orientation for both left and right channels.

Spaced out

Although you tend to assume with stereo sound that you need to be seated exactly half-way between the speakers, sometimes it's desirable to create a different spatial sensation – and that's where "spatialisation" effects come in. 3D spatialisation has made it possible to "place" sound above, below or behind the listener.

Pro Tools. A considered purchase but an appealing interface with quality results.

ToolBelt

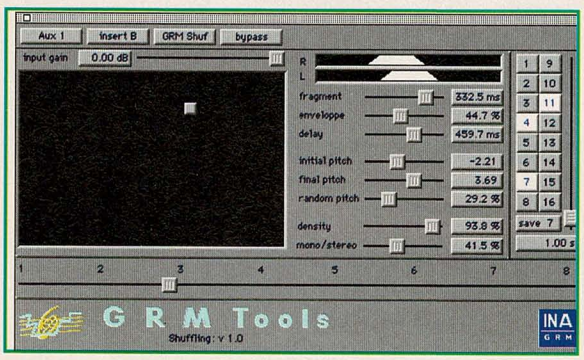
MF rating 84%

Hyperprism

TDM plug-in v1.0.1 £699.13
Upgrade v1.1.2 £176.25
Stand-alone for Mac v1.5.5, £404.20
Stand-alone for PowerMac, £270.25
Unity Audio
Unique processing software which enables you to create effects in real time, either via your standard MIDI set-up or by dragging the mouse around a window. For a full review, see MACFORMAT 42.

TC Tools

TDM plug-in, £774.33
Digidesign
Contains two processes – **reverb** and **chorus** – based on the algorithms used in the TC M5000 hardware effects unit. It uses 24-bit software processing for extremely high-quality results. The reverb section has over 30 reverb presets and there are ten chorus, flangeing, slap and echo effects. The interface is highly graphic and easy to use. Expensive, but you're paying for quality.



GRM Tools' Shuffling plug-in supports the micro-random splicing of audio fragments – if you have to ask...

GRM Tools

Stand-alone v1.51, £399.50
Unity Audio
A set of 14 processing functions in one package. Each has its own control panel and can run in real time.

They include **Add Synth** (additive synthesis), **Band Pass** (filter with slopes grater than 560dB), **Comb Filters**, **Delay Accum** (multi-delay processor), **Doppler**, **Levels** (level display and calibration), **Equal 23/14/8** (graphic EQ), **Freq Conversions** (sampling frequency and playback speed converter), **Gate Ring** (noise gate with a multi-oscillator ring modulator), **Pitch Accum** (harmonisers and delay), **Pitch Random** (random harmonisers), **Shuffling** (micro-random splicing of audio fragments), **Time Freeze** and **Time Stretching**.

It's an interesting collection of processes from the useful to the downright weird. A graphic interface helps make adjustments to parameters easier. Good value for money.

GRM Tools Plug-Ins Vol 1

TDM plug-in, £305.50
Unity Audio
Another Time Division Multiplexing (TDM) plug-in containing four GRM Tools – **Comb Filter**, **Doppler**, **23-band EQ** and **Shuffling**.

GRM Tools Plug-Ins Vol 2

TDM plug-in, £305.50
Unity Audio
A TDM plug-in containing another set of four GRM Tools – **Band Pass**, **Delay Accum**, **Pitch Shift** and **Time Freeze**.

CyberSound FX

SoundEdit16
Adobe Premiere plug-in, £81.08
Adobe Shop
This has the proud distinction of being the cheapest plug-in in all three parts of this digital audio series. Not only that, but it boasts 15 effects and almost 240 presets. Programming is by way of sliders – that's as graphic as it gets – but for sheer value it can't be beaten.

CyberSound FX was reviewed in detail back in MACFORMAT 42 – it was a MACFORMAT Classic, in fact, awarded 92%.

EM 1 Eternal Machine

TDM plug-in, DM895 (about £360)
SDII plug-in, DM895 (about £360)
APB Tools (distributed by Media Spec)
This set of plug-ins, available for *Sound Designer II* as well as TDM, offers dynamic time **compression** and **expansion**, **dynamic filtering** (also known as morphing) together with **dynamic pitch shifting**. All parameters can be changed at any time you choose. They can also be changed at any frequency point inside the sound using envelopes to draw changes onto the waveform. **MF**

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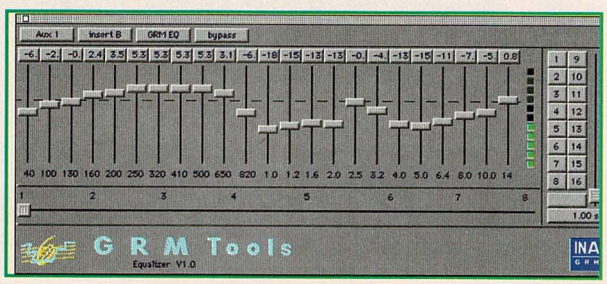

GRM Tools' 23-band graphic EQ – sliders to wrap your mouse around.

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Grolier Multimedia Encyclopedia 1997

Another year, another update. Jump feet first into an encyclopedic information fest and emerge with knowledge overload.

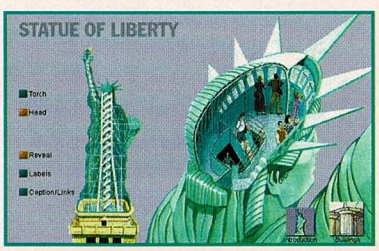
Life, it seems, is "American". The latest update of this sprawling but flawed encyclopedia may feature a mildly tweaked interface and a dynamic new **Interactivities** section, but its world view remains, as ever, an American one. Look up "football" in the search engine and you'll find a game with an oval-shaped ball featuring large men dressed in motorbike gear. Run the movie of the "Year in Review" and you'll find Clinton and Gore, not Major, Blair or Chirac. You have to remind yourself that this is a European release.

The Cathedral of Sierra, Southern Italy. It's not all U S and A – Grolier contains many historical buildings from all over the world.

If you can ignore *Grolier '97*'s continuing US slant, then this version is without doubt the finest yet. *Grolier*'s greatest strength has always been size and the 1997 version is bigger than ever. It has a staggering 34,000 articles, 15 hours of audio, 10,000 images, 600 musical selections and dozens of video clips. With so much on offer, where do you start?

As in the previous versions, everything is led by the use of the search engine. You type in your chosen subject in the **Browser Box** and a list of related articles line up below. These range in length from a few sentences to whole essays, but in keeping with the nature of encyclopedias, they are never more than hyper-linked Cooke's tours. David Bowie, for example, merits only a couple of paragraphs.

From here you can go to **The Gallery**, where you'll discover a wealth of multimedia including an atlas, photographs, maps, movies, animations and sounds. Everything from the definitive words of Martin Luther King to the noise of an elephant call is housed here, but the contents do seem like they've been chosen rather randomly at times. How many people, for instance, are likely to want to hear the national anthem of Mauritius?



Peel back the outer layers of the wonders of the world with Interactivities. Here, the Statue of Liberty's inner workings revealed.

Elsewhere, there's the **Timeline** and **Yearbook** menus, which divide world history into 11 compacted chunks – a whistle-stop tour so fast it brings tears to your eyes. An example of this is the "Year In Review 1995-96", one minute of global news, spat out in super-fast-forward speak. Then there's the **Guided Tour**, now boosted to 16 topics including "The American Novel" and "Monsters".

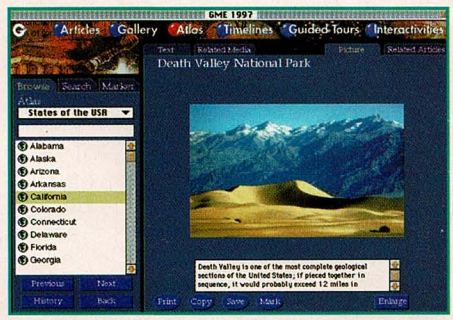
This is arguably where *Grolier* performs at its most sophisticated level, giving you articles, fact boxes, video and sound clips. It's a well-rounded introduction to each subject, which allows you to skip around as you please, picking up information wherever you go. The problem with this tour is you wish there was more of it – and this is the same with the all-new **Interactivities** section. Containing seven subject areas, ranging from "aviation" to "human anatomy", **Interactivities** enables you to "strip away" the outer layers of areas like animated jungle landscapes or a model of the Statue Of Liberty and see how things work from within. This is by far the most interesting and useful add-on of this version of *Grolier* – a pop-up book brought to life!

Ultimately, though, *Grolier '97* is only a marginal improvement on its previous outing. The excellent **Guided Tours** section has been expanded and the **Interactivities** section is enjoyable and informative, but everything else remains largely as it was. The hypertext-linking is quick but still as dull and frustrating as ever, taking you to places you didn't want to go to or to subjects you've already seen. And as before, much of the text is too small to read, requiring you to enlarge it, consequently losing any accompanying images.

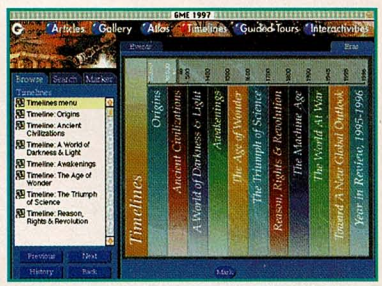
Lon Chaney (1883 - 1930), silent movie icon, seen here in *London After Midnight*. Grolier '97 includes many Academy Awards with the focus, as usual, on the American way.

But let's not forget what makes *Grolier '97* a serious contender in the world of educational CD-ROMs: its sheer volume. Quite simply, if you want to find it, you'll find it here. Like the country it hails from, *Grolier Multimedia Encyclopedia 1997* is a sprawling, eclectic, sometimes infuriating and utterly fascinating collection of just about everything under the sun – including, of course, the sun itself.

GIL GILLESPIE



Death Valley National Park in California. The hottest and driest place in America and not somewhere to go for the day.



The Timeline feature splits history into 11 compacted chunks and enables you to view a movie of "1995-96 The Year In Review". It barely lasts a minute and is narrated at such speed that it almost leaves tyre tracks on your Desktop.

Grolier 1997

Comprehensive, but very American-based and rather indiscriminate. Good introductory materials but not enough real depth.

MF rating 72%

What, more?

To boost *Grolier*'s information-giving potential, you can use the links to the Internet, providing you have a connection. Just click on the appropriate button when it appears, and you're away.

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The Way Things Work 2.0

When children reach a certain age, their every sentence begins with "how" or "why". Perhaps their curiosity could be satisfied by this new CD-ROM.

Version two

Veterans of multimedia will no doubt remember version 1 of *The Way Things Work*. This is not a sequel but an updated version. Most of the basic screens are the same, but this time around there's more video – and David Macaulay has a higher profile.

The mind of a child, it's often said, is like a sponge. Children seem to delight in soaking up new information. Rarely, it seems, do their faculties tire of absorbing facts and they never seem to reach a point of saturation.

This is undoubtedly a good thing – children need to learn. Anyone who's ever had anything to do with a six-year-old will know, however, that a child's quest for knowledge can quickly become the bane of your life. "What's a television made of, Daddy?" "How does a camshaft work, Mummy?" "What's relativity, Uncle Albert?" You know how it goes.

The Way Things Work 2.0 goes a long way to remedying this syndrome. It won't explain poverty in cities, or the problems of the Middle East, but it will certainly give your kids masses of insight into what makes everyday objects work.

Presented by the mustachioed David Macaulay, who pops up here and there in movies and does most of the narration, the disc consists of hundreds of interactive screens, each dedicated to a mechanical or electronic device. For instance, on the screen about the vacuum cleaner, you'll find a bit of text explaining how it works, and an explanatory cut-away picture. Click the word **Clean**, and the machine jumps to life with a whir, the animation showing how air moves through the appliance. Furthermore, you can call up a note about the dust bag, or jump to another screen all about the electric motor.

Likewise, clicking the word **Principle** at the left of the screen calls up a listing of the scientific principles at work. For the vacuum, pressure is the only one involved. For a television, on the other hand, they include telecommunications, light and images, and electricity. Having chosen a principle, you're off to a new screen with plenty more definitions, animations and links to other screens.

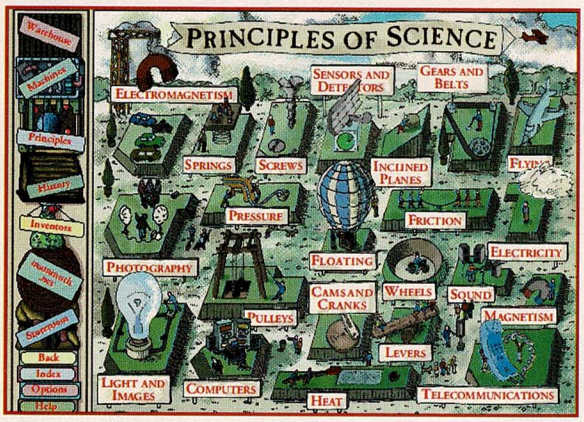
It's the crosslinking in *The Way Things Work 2.0* that really makes the disc so enjoyable. You can skip your way around the information, picking up fact after interesting fact. Children using the disc can follow their own route through it, but the disc's ease of navigation will make it compelling even for adults.

The other great thing about this CD is that it's tremendous fun. Illustrated in a way similar to the *What a Mess* picture books, it's packed with little animations that liven up the screens. Featuring heavily in these animations is a comic woolly mammoth. On the fire extinguisher screen, he douses a campfire with his trunk – and on the solar heating screen, he dives into a swimming pool.

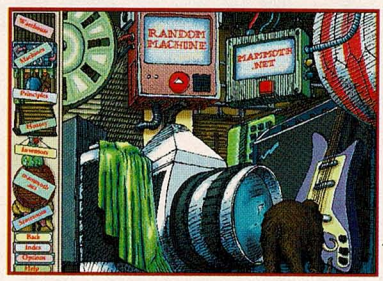
In other instances, the woolly mammoth plays the main role in a cartoon movie. These are simply brilliant when they pop up, with each one demonstrating a simple machine in a bizarre way. To explain the lever, for instance, the topic is mammoth hygiene, and you see a keeper desperately trying to lever the lazy beast to its feet.

The only real drawback of *The Way Things Work 2.0* is that it runs rather slowly. Screen transitions take a little too long, even on a machine as powerful as a PowerMac 7100. It could also, perhaps, do with a bit more sound.

Like most Dorling Kindersley CD-ROMs, however, *The Way Things Work 2.0* oozes with class, quality and value. It's a great disc for family use and just the thing if your kids are full of "how" and "why" questions. **JOSEF MORRELL**



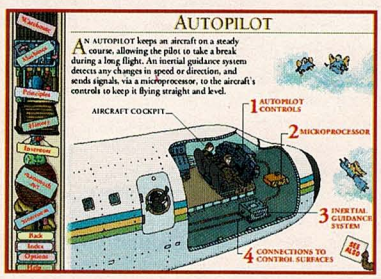
At its heart, *The Way Things Work 2.0* is a disc about science. It includes basic information about more than 20 scientific principles.



Younger children might want to follow the mammoth into the "warehouse" – click on objects to go to more screens about them.

Mammoth Online

Internet users who buy *The Way Things Work 2.0* can take advantage of the mammoth.net Web site in addition to the disc. Presented in the same way as the disc itself, the site includes videos, sound, animations and information relating to the latest inventions. It is run by David Macaulay himself and includes competitions and suggests further activities.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The movies are actually highly imaginative ways of telling children about various ideas – this screen explains levers.

The Way Things Work 2

Full of clear explanations and plenty of fun. Kids will find this easy to use, and can learn at their own pace.

MF rating 88%

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Extras: 2x speed CD drive		**AGE RANGE**	8 and up				

Castle Explorer

History lessons are given a burst of flavour, and a certain aroma, with this disc about mediaeval castle life.

Between the fall of Rome and the Renaissance, between barbarism and the reawakening of civilisation (not to mention the rediscovery of plumbing and sanitation), lie the Middle Ages. Western Europe's political, religious and economic life in these malodorous times went on under a remarkably sophisticated feudal system.

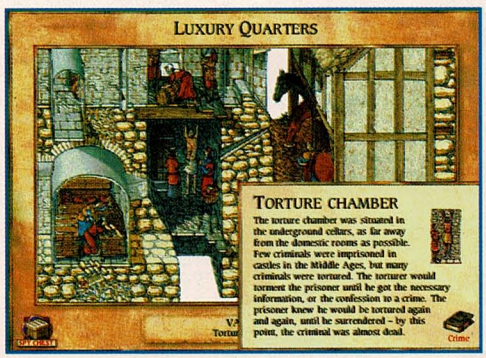
Dorling Kindersley's *Castle Explorer* values fun far too much, however, to harp on about the centrality of feudalism to the structure of medieval life. Instead, this disc opens up to reveal an enormous castle meant to be typical of one you'd find in 14th Century Europe.

The core of the disc is a set of ten massively detailed cross-section drawings illustrating life in the castle. You can zoom in on any of these, as well as roll the cursor around the screen and click to call up "caption cards" that explain what's going on. At the same time, you're meant to be spying on castle life and collecting pieces of the castle map. The gaming premise is compelling enough, but kids will probably have just as much fun with the information.

Outside the castle, a siege is underway – and you can click on the various machines of war pictured for more information on what they did and how they worked. You'll learn, for instance, that it was common practice for siege-layers to build huts close to fortress walls and attempt to burrow underneath the foundations of the structure. Having done this, they'd light a fire in the hole, to try and bring the wall down.

It's such odd little details as this that make the disc so interesting to browse through. Straightforward discussions of kings, warfare and feudalism tend to bore youngsters senseless. The gritty particulars captivate them – and a medieval castle was full of grit.

This warts-and-all honesty is juxtaposed in *Castle Explorer* by several slick features. Though each of the ten cutaways is two-dimensional, you'll also find 3D rooms to explore. In the luxury quarters, for instance, you can click your way *Myst*-style through the Solar (the baron's bedroom). In the craft workshops, meanwhile, you'll come across the Armoury, where you'll meet the armourer in a video clip and hear his comments on various items.


LUXURY QUARTERS
TORTURE CHAMBER
The torture chamber was situated in the underground cellars, as far away from the domestic rooms as possible. Few criminals were imprisoned in castles in the Middle Ages, but many criminals were tortured. The torturer would torment the prisoner until he got the necessary information, or the confession to a crime. The prisoner knew he would be tortured again and again, until he surrendered – by this point, the criminal was almost dead.

Beneath the baron's quarters, you can explore the fate of criminals in anything but luxurious conditions.

These 3D interludes are, however, more flashy than they are useful. Further information is available through the cross-section drawings: discover a latrine, for instance, and you can go straight to a reading book on "health", where you can flick through ten pages covering latrine architecture, sewage, the smell and so on. Many castle moats, *Castle Explorer* tells you, had to be drained and dug deeper simply because excrement made them shallower. Lovely.

Fascinating and detail-packed as it is, *Castle Explorer* has all the pace, fluidity and responsiveness of a three-legged mule. When you've zoomed in on a scene, scrolling your way around can be tediously slow and jerky, enough to test the patience of any youngster.

It's a shame *Castle Explorer* tends to besiege a Mac's processor and CD-ROM drive as it does, because the disc is dense with tantalisingly interesting and often humorous depictions of life back in the days of honour among nobles and squalor for the rest. **JOSEF MORRELL**

Castle Explorer

Like a feudal lord, eloquent, engaging and full of finery – but dogged by an annoying lack of mobility.

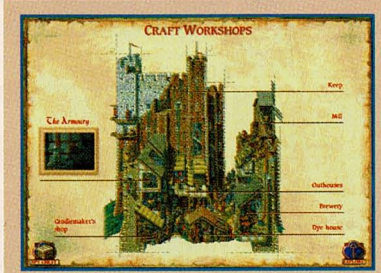
MF rating 81%

Cutaways Galore

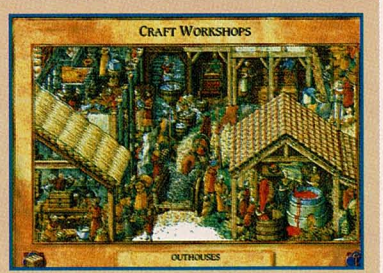
Half the fun of exploring the castle lies in finding its removable roofs and walls. Here's an honest butcher's hut.

Pull away the roof section, however, and inside we can see the butcher's wife gutting a swine. Charming.

Close up of Castle Life



There's plenty of activity going on in each of the castle cutaway illustrations.



You can zoom in on an area and see what's going on in more detail.

ON THE CD

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Cardboard city

Included with *Castle Explorer* is a 59-piece cardboard scale model of a castle, which you can spend literally hours putting together with your children. It's a shame this castle doesn't, however, point you to various bits of information on the disc.

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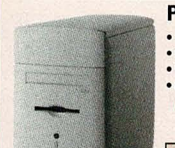

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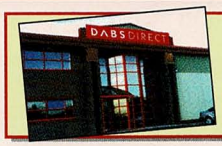

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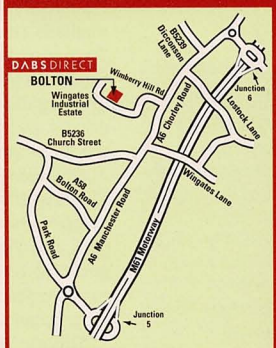

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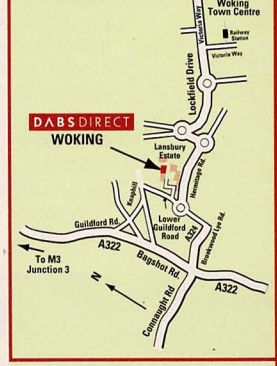

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Origins of Mankind

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Before we walked, we lumbered. Before we lumbered, we crawled. Before that, we scurried about. And before *that*, we swam. If anything can fire the curiosity of Homo sapiens, it is the story of our own evolution: from fish to sophisticated flesh in a few million years.

This much-advertised "Exploration of Human Evolution" from Maris Multimedia is an attempt to document some 70 million years of human ancestry. The timescale has seen the hair-to-body ratio drop significantly, the posture improve greatly and the eating habits become a whole lot more refined.

Divided into eight informative sections, *Origins of Mankind* is certainly a journey worth taking. After watching a dark and gloomy introductory sequence, you find yourself in front of a neatly laid out interface. From here, what you dig up is largely up to you.

You can visit the Timescale feature, which traces the ages of man from the most ancient primate to the arrival of the Homo sapiens. You can devour snippets of information on subjects like the unpleasant food choices of a particular generation, or you can swoop at high speeds through a theme park of the Ages of Man, stopping to investigate any creature of your choice. You can also read about great palaeontological discoveries or trace the development of theories of evolution. You can even embark on a virtual archaeological expedition with a host of experts at your side.

But the aspect of *Origins of Mankind* that will cause the most interest, especially among the young, is the inclusion of some high-quality QuickTime animation – it is here that the story comes alive. Using short film clips, you can drop in on our distant cousins and watch them sitting round a camp fire, or tucking into a delicious feast of raw antelope.

Maris has also included a section that uses "morphing" techniques to visualise the physical transformation of humankind through the ages, with the body, the skeleton or the head re-shaping itself in front of your eyes. Watching the beast mutate is like watching a skinny gorilla doing slow-motion aerobics, but the animation boasts such a deep, earthy realism that it inevitably enhances your curiosity tenfold.

Considering the difficulty of the subject, *Origins of Mankind* is easy to use and reassuringly friendly in tone. This may be science, but you won't get bogged down in terminology. It's ideal for the early years of secondary school, as is the inclusion of an archaeological game and a multiple-choice quiz.

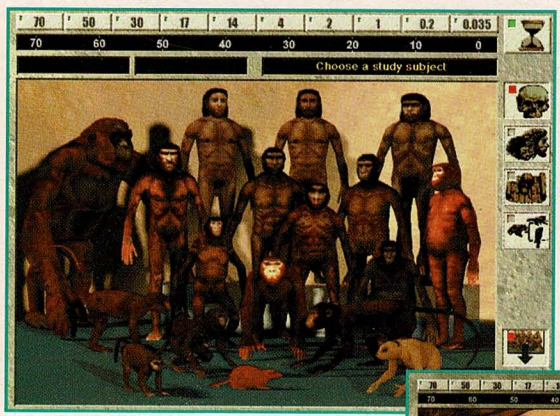
Yet, despite its worthy attempt at clarity, *Origins of Mankind* is not without problems. It's not clear just how and in what order you should use each section. Whether you settle for just "skipping-around" or follow things in chronological order, there's not that much actual information on each period, so the CD lacks any real depth. Also, you can complete your journey through the entire evolutionary process in under an hour. Hence the add-on game and quiz.

That said, *Origins of Mankind* is still an ambitious and accessible project, offering much interesting and entertaining detail about an often overlooked aspect of our history: ourselves.

GIL GILLESPIE

Jungle life

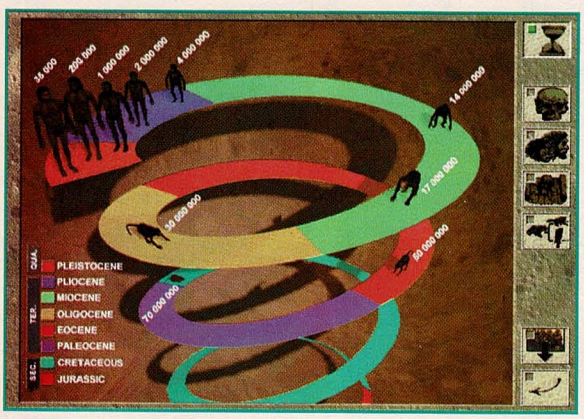
Throughout *Origins of Mankind* you'll hear music. Most of this is of the jungle-bongo variety – but every so often you'll hear a *Twin Peaks*-style aria rise as if from nowhere. No appearance of the Log lady, or any damn fine cherry pie, though.



Meet the family. Sitting down at the dinner table with this little lot would be a whole new experience. Instead of talking about, say, the Habitat sale, they'd probably be more interested in fighting. "Another Linda McCartney sausage, Ug?" Please yourself.

The interface is appropriately earthy in colour – you can almost feel the skin and bones. On second thoughts, maybe not.

The Ages of Mankind from pre-history to today. The morphing section is the program's most exciting feature.



The Time Spiral section sees mankind rising from the swamps on a colourful bendy thing. It will help you locate each development on the evolutionary ladder.

Origins Of Mankind

An original and educational look at our evolution, with great video clips included. Lacks signposting and depth, though.

MF rating 68%

It's like driving through a theme park of ourselves. Here, you swoop through man's parklife, from the earliest squeak to the deepest grunt.

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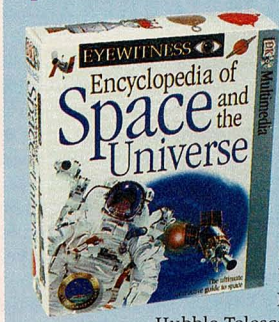

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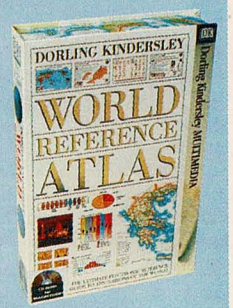

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MAC	**Processor:** 68040 • **RAM:** 8Mb	**POWERMAC**	**Processor:** any • **RAM:** 8Mb	**REQUIRES**	**System:** 7.5 • **HD space:** 24Mb • **Screen:** 640 x 480 •		
Colours: 256 • **Extras:** 2x CD drive • Two button mouse recommended							

WarCraft II: Tides of Darkness

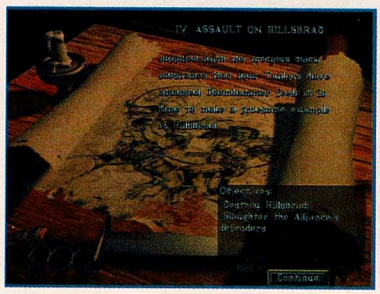
War, what is it good for? Well, it's a pretty good setting for a computer game for a start. Shooting and strategy both feature in this latest wargame release. James Flynn explains how it works.

MACFORMAT Classic

If *Civilization* and *SimCity 2000* have revolutionised the traditional strategy game, *WarCraft II* is bidding to do the same for wargaming. So far, it seems to be off to a fair start. Along with *Civilization*, it has proved to be one of the most successful and most played games on the PC. It has spawned a fierce level of debate around the world (well, over the Internet, at any rate) as to whether it's better then the superb *Command & Conquer*. And yet, the reasons for this enthusiasm aren't immediately apparent when you load up the game.

The Orcs vs humans aspect is central to *WarCraft II*. Similar units but different tactics are necessary to win.

Oh, the presentation is impressive enough, and the attention to detail is appealing. But *WarCraft II* is a completely conventional top-down, 2D wargame from the same mould as the good old *Command & Conquer*. The aim is simple – kill the opposition – and the gameplay principles of resource management, unit and building construction have been tried and tested for years. It's only when you play for a while and begin to appreciate how these familiar elements are put together that you begin to suspect *WarCraft II* may be a bit different from the rest.



Every mission in *WarCraft II* is linked by some quality video footage. The story reaches a tense finish after days of play.

The scene is set by a brief rendered introductory sequence depicting a force of humans being pursued across the fantasy land of Lordaeron by a horde of orcs. The traditional cross-race hatred is driving the vicious orcs to destroy the humans, who are resisting to the last and whenever possible making counter-attacks. The first choice for you to make is whether to play as the orcs or the humans – your decision leads to a completely different, though connected, series of missions throughout the game.

The fog of war is one of the game's strongest points. Exploration reveals the structures, but they are not kept updated.

The two sides' similarities and differences are possibly *WarCraft II*'s greatest asset. The orcs and humans have the same number of units and buildings with the same statistics, and after a short time of playing both it becomes clear that the basic tools with which you have to do the job are identical. They never feel the same, however, thanks to the strong characterisation that each side possesses.

Central to this is the sound, which for

What does it all mean?

The world as you know it. By clicking on sectors here it is possible to either view the areas you've explored, or send in units without wasting time scrolling around the map manually.

Selecting a building reveals the list of commands available. The Great Hall is the centre-piece of Orc civilisation. Upgrading it enables the next stage of development to occur.

Limited supplies of lumber, gold and oil are the restricting factors in your growth. Upgrades or purchases may be cancelled at any time with a refund but it wastes time.

The most important figures in the game, the gold, lumber and oil also govern what you can build. After every building has been constructed, you then have to race to construct armies.

Farms are one of the essentials of your war effort. Each units consumes one ration of food, so your ultimate force strength is partially governed by the number of farms you have.

The ballista is the best siege weapon in the game. However, it's totally vulnerable to massed attacks, making a powerful escort vital while it goes about its destructive tasks.

once in a computer game deserves a special mention. Every character has two or three recorded voices that bark out whenever you click on them. What this achieves is the perfect balance between humour, functionality and identification which ensures that you think of your characters as living knights, berserkers, mages or whatever, not just numbers on a spreadsheet. Caring about your little people makes the atmosphere of the game so much more enticing.

You play on a map screen, and the game involves constructing armies and conquering the enemy. You construct armies by buying them, using a combination of three natural resources: gold, lumber and oil. You acquire gold by sending peasants into mines, lumber by sending them to chop trees, and oil by sending ships to drill for it. Peasants themselves cost money, so maintaining the right balance between workers and defenders is critical to success.

As the game progresses the levels become bigger, harder, more complicated and a lot more fun...

Peasants are also the only unit that can construct buildings. Each side has about 20 structures, each of which gives certain advantages to your civilization. Lumber mills, for example, increase the amount of lumber produced from tree chopping by 10% as well as offering the facility to construct higher quality arrows, thereby making your archers more effective. Constructing ogre mounds when playing orcs allows you to upgrade another building to a fortress, which in turn opens up new possibilities. And so it goes on – each unit is dependent on something else, you must look into everything at some point and the whole bundle meshes together perfectly.

Into battle

Most games become a matter of starting with nothing and ruthlessly exploring for new resources and opportunities. You must build up a defensive force consisting of towers and troops capable of withstanding surprise attacks, while simultaneously assembling new armies and setting off in pursuit of the enemy...

The human forces are focused around preservation and healing, whereas the Orcs are an entirely destructive race.

When it comes to the battles themselves, the differences between the two sides become obvious. The orcs are a far more destructive, powerful combat force than the humans, many (though not all!) of whose abilities are centred on limiting and preventing damage rather than causing it. Completely different tactics are necessary to succeed with the two sides, so, while the basic tools are the same strength, the ways they are implemented and deployed are very different.

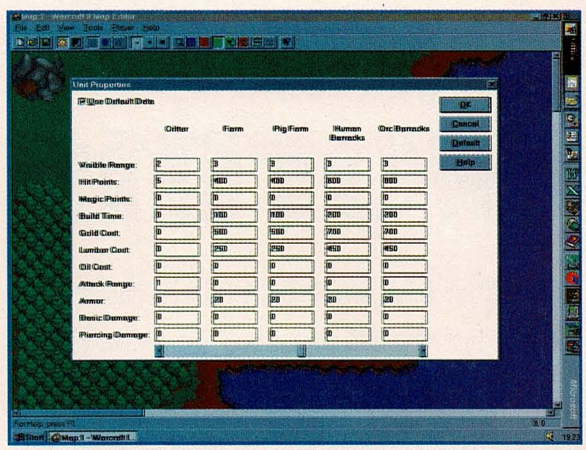
Full frontal attacks by bloodthirsty, pumped-up orcs are devastating, as are blizzards hurled from afar by the human mages. Each unit has upgrades that make it increasingly lethal, but deciding on the merits of which to research, when you're short of cash, is another factor in each game's outcome.

When the inevitable combat does come round, it's far from a case of selecting all the units you can see and clicking on a target. The front-line troops, such as paladins and ogre-mages, should be used to protect the weaker rangers and berserkers. Meanwhile, move your ballistas into position, lay mines to slow advances, take out defensive towers and send in demolition squads and invisible mages to destroy reserve troops and barracks. Add to the equation flying but relatively vulnerable units like dragons and zeppelins to spot submarines and negate scenery advantages, and you get a picture of how complex the whole operation can become. The combinations seem almost endless, and you'll still be discovering new strategies and tactics after six months of intensive play.

Juggling cut-throat attacks with producing more troops on the other side of the map is a real art, and it's only the excellent control mechanism that makes it possible. Each unit's primary function (fighting or building, for example) is activated by selecting and then clicking the mouse. You get them to move by clicking with the **[command]** key held down – slightly more fiddly than the two-button PC mouse counterpart, but double-clicking would have been even better (and more intuitive for Mac users). There are also numerous shortcut keys that can make the difference between winning and losing.

There *are* problems or areas that could have been handled better in the game. The computer's artificial intelligence (AI) isn't very aggressive, and it's not exceptionally intelligent. It's far from being a push-over, and on most missions the enemey base will have been very well constructed, but when it comes to offensive moves, they tend to be limited and average. Also, the lack of a facility to group units together into mini-armies can become very frustrating, and responding to counter-thrusts is very tricky.

Now take everything, good and bad, multiply by a factor of about ten, and you have the multiplayer game. Playing other people makes you appreciate the shortfalls of the computer AI more acutely, and once again it demonstrates that multiplayer gaming is where we should all be heading. People are more aggressive, ruthless and clever than anything a Mac opponent can throw up, and the game offers modem, direct connect, TCP/IP, AppleTalk and IPX network facilities. The IPX facility is particularly unusual, as it enables Mac users to connect to PCs on the same network. If you have access to a network this is an essential game to own.



The IPX network option enables you to play both PCs and Macs. This means you can use the huge numbers of custom PC levels.

Your air power consists of ornithopters and dragons. Dragons are powerful, but also the most expensive single units you can buy.

The animation is smooth, the sprites are colourful... This could go on for ever. Buy it and see for yourself. **MF**

WarCraft II

A delight to look at, excellent effects... In multiplayer mode, as near to perfect as a game of this type has come..

Graphics	**92%**
Sound	**91%**
Gameplay	**93%**

MF rating 93%

The Editor

Included with the game are map and sound editors, which you use to build your own maps. There is also the actual game spreadsheet that contains details of all the unit strengths, and you can play around with it freely, although they're best left as they are for the most part. If it still all seems too much effort, there are a multitude of maps available on the Internet. The vast majority of these are large, free-for-all, eight-player affairs, and many are easily as good as the official maps. Check out Blizzard's web site on www.blizzard.com for links to these.

PRICE	£29.99	**ON SALE**	Now	**CONTACT**	Team 17 on 01924 271637	**WEB SITE**	http://www.team17.com
MAC	**Processor:** 68020 • **RAM:** 8Mb	**POWERMAC**	**Processor:** any • **RAM:** 8Mb	**REQUIRES**	**System:** 7.1.2 • **Screen:** 640 x 480 • **Colours:** 256 • **Extras:** 2x CD drive		

Worms

Blackbirds would think twice if their early-morning breakfast came armed with a bazooka. James Ashton is quaking with fear – play this game and you'll never tread on a worm again...

Strategy is everything! Move your worms into position and shoot at the enemy – much more fun once you learn the keyboard shortcuts for the weapon and movement options.

If you're a computer game designer, you have only one quest in life. Far from wanting your games to be hailed as the flashiest, most realistic things ever designed on a Silicon Graphics machine (although, obviously, that would be nice), what you *really* want is to come up with a completely original idea. You want to design the first *Space Invaders, Pong, Pac-Man, Pole Position, Lemmings* or *Doom*; you want to design a game which people will refer back to in the future and hail as a gameplay classic.

Team 17 and Ocean see *Worms* as just such a game. Since it was released in various console formats almost a year ago (at least we've finally got it!), it has never dropped out of the top 20 CD-ROM games chart and has collected press and trade awards by the ill-fitting hatful. Part of this enviable success is due to the immense marketing push Ocean initially gave it, and the modest hardware specifications it requires to run. But the largest chunk is undoubtedly down to the fact that *Worms* is almost (but not quite) a classic game.

Up to four players can participate at any one time, and each has a team of four tiny worms. The aim of the game is to kill all the opposition and remain the last worm(s) standing. When a worm is hit, it will lose a certain number of "hit points" depending upon the strength of the attack. These points are displayed above each worm's head, and when its personal total reaches zero, the war is over for that worm (sigh). The principle sounds simple enough but *Worms* soon becomes a devilishly tactical game.

Play takes place on a two-dimensional landscape, surrounded by and often split by scorching lava seas. If worms fall into these green oceans they die instantly. (One of the major tactics of the game is to use the more powerful weapons to catapult the enemy into an early bath.) With so much blasting weaponry at the worms' disposal (bazookas, missiles,

You can create and name your own team of worms, or you can use the game's wide variety of pre-existing ones.

Parameters

You can alter most of *Worms'* game parameters individually, from how long you have to make a move, to the availability of weapons and so on. But small alterations can mean a big change in the tactics you'll need, so make sure you decide wisely!

Worm fodder

1 Each turn in *Worms* allows you to move and fire one of your worm team. Movement is carried out with the cursor keys, using **[return]** to jump over minor obstacles.

Your position relative to the enemy is all-important when it comes to selecting your weapon and the damage that your choice finally inflicts on the wiggly target.

Your target in this instance is Clanger. Your active worm (up the hill with no name tag) is now perfectly positioned to launch an attack.

2 With your worm positioned, it is now time to choose a weapon. Success in *Worms* is largely dependent on a good understanding of which of the array of weapons are the most effective in which situations.

Because we're reasonably far away from Clanger, and uphill, choosing the grenade seems like a good plan. You can select your choice via its function key shortcut or by using the **[command]** button to bring up the **Weapons Point-and-Click** menu.

3 The **[space bar]** fires and launches your selected weapon and the length of time it's held down determines the range selected. With a grenade, make sure that the explosion is far enough away from you to avoid any "friendly fire" accidents – but not so far as to miss your target.

Particularly damaging shots made by a worm are rewarded with an instant replay. The action on Clanger isn't considered spectacular enough for this but your mission is accomplished: Clanger is now an ex-worm.

Earthworks

As well as the worms' enormous arsenal of weapons, there are more than a couple of movement and tactical tools to play with.

Teleport: Moves your worm *Star Trek*-like to any other part in the level. Limited in availability, but good for getting you out of tight scrapes.

Bungee: Bungee-jumping off cliffs can actually be a safer way of getting down from them. (If your worm falls too far, then your turn automatically ends.)

Blowtorch: Used for burrowing into the ground. The blowtorch can be used to create safe hiding places for your more cowardly worms.

Ninja Rope: Opposite to the bungee, really. Used for scaling cliffs and running for the safety of high ground.

Drill: Similar to the blowtorch, but you can only drill vertically down. So beware, this can leave drilling worms vulnerable to attack from above, particularly from dynamite or grenades.

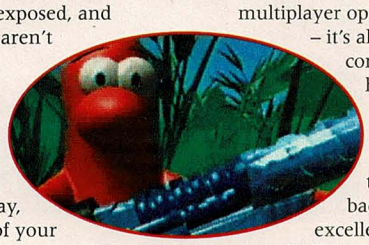
Girders: Designed for use as bridges between separated land masses, girders can also be used as obstacles for your enemy or as reflectors for grenade and bomb attack.

After a couple of rounds of bazooka fire, it's possible that your landscape can be altered beyond recognition.

Although quite why there's an enormous lollipop in the middle of this one is a question best left unasked. Programmers, eh!

The landscapes are randomly generated for each game. There are well over a million possible combinations, apparently.

grenades, cluster bombs, banana bombs, shotguns – the list goes on), it's no surprise that the landscape comes in for a fair amount of demolition. You may think that your worms are safely sheltered, but they could soon find themselves perilously exposed, and negative hiding tactics aren't the answer as this can always be countered by the deadly "Homing Sheep", which run towards you and explode.



You take turns to play, having a go with one of your annelid team before passing on to the next player. One turn will typically consist of moving a worm (they can walk, jump and use grappling irons) before firing a well-selected weapon at one or some of the unfortunate enemy. However, the turn-playing system can be a significant disadvantage to players three and four, who will often find their teams already seriously damaged before they even get a chance to use them.

Another noticeable flaw in *Worms* is the rather dodgy command interface. *Worms* was previously brought out in console form and the interface appears to have been converted from this. If you can't remember shortcuts in the game, you can call up a menu bar, but this isn't particularly pleasingly integrated into the player interface.

However, *Worms* does have a lot going for it. It's simple enough to load up and play but real success is dependent on a rich seam of Lemming-esque tactics. The multiplayer options are excellent fun – it's always best to play computer games against human opposition, after all – and the built-in network facility increases these possibilities. The background music is also excellently atmospheric, as are the fruity explosions and the sampled squeaky worm voices, which taunt you with telling insults like "Stupid!", "Come On!" and "Boring!"

Because of the large initial element of chance (success in the game very often depends on where your own worms first find themselves in the landscape), the slow turn-by-turn nature of the play, and the ropey command interface, *Worms* is not quite up there with the all-time greats. But it is superb particularly as a multiplayer game and works happily on a wide range of Macs, so it's still well worth getting up early to catch. **MF**

Worms

Simple concept with almost endless tactical possibilities. Great multiplayer game but let down by clumsy interface. Almost a classic.

Graphics	**70%**
Sound	**81%**
Gameplay	**90%**

MF rating 89%

ON THE CD

Check out the playable demo in the Demos folder

Network

Worms is most fun when played against human opposition. If you're not so keen on having three friends crowding around your keyboard (and you have 8Mb more RAM), you can play over an AppleTalk network or the Internet. You can also send in-game "chat" messages as in *Doom*.

Every so often, weapon crates will parachute down. First worm to reach them picks up some new artillery.

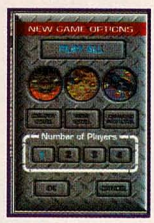
Any obstacles in your worm's path can be removed using the blowtorch. It's only got a limited range, though.

PRICE	£19.99	ON SALE	Now	CONTACT	Sierra on 0118 920 9111	WEB SITE	http://www.sierra.com
MAC	Processor: 68040 • RAM: 12Mb	POWERMAC	Processor: any • RAM: 12Mb	REQUIRES	System: 7.1 • Screen: 640 x 480 • Colours: 256 • Extras: 2x speed CD drive		

3D Ultra Pinball

The current pinball craze grinds on, and this new space-age game has gimmicks galore! But as any real pinball player will tell you, gameplay is ultimately more important...

The **Colony** table (left) doesn't have enough features to make it interesting. Look at all that empty space!



You can opt for five rather than three-ball play.

ON THE CD

Fully-playable, time-limited demo on the CD

Wherever you go in the world, you'll find the same sort of things in the cupboard under the sink. Along with disinfectant, household bleaches and ant-killer, under the sink is where all the time-saving, life-enhancing, space-consuming household gadgets you've bought end up, quietly living out their days. They may have promised to peel, mince and make ice cream in ever more imaginative ways, but when you find it's only gimmickry, as you inevitably do, they soon take up residence in those dusty, dark corners.

3D Ultra Pinball is a cupboard-under-the-sink computer game. Masquerading as a pinball simulator, it sells itself on its "innovations" and disguises the fact that nothing else really works properly. Despite being dubbed the "fastest pinball in space", *3D Ultra Pinball* is undoubtedly the worst pinball simulator available for the Macintosh.

The game contains three different tables – **Colony, Mine** and **Command Post** – with all three following the same "unique design". Instead of the traditional pinball format – simulating the real life arcade machines – *3D Ultra Pinball* uses tables which have three pairs of flippers, as well as a small sub-table on each side of the main play area. After you complete certain scoring tasks, these side areas become accessible – and once the ball is shot into one, you can use the sub-flippers to keep it there. Pinball profanity to the connoisseurs, but possibly a fun addition for the less precious.

Well, it might have been but for two rather major flaws. First, the two side tables are far too small to have any gameplay value when the ball is in one of them. Your success can only be a matter of luck as there's certainly not enough room to plan any specific shots. Second, and rather more damning, the graphics, ball movement and table design are of such abysmally low quality that they bring back memories of Spectrum 48Ks, Dragon 32s, Commodore 64s and the computer games boom of 12 years ago.

The **Mine** table has some interesting features but is still terribly poor. That ball *is* balanced on that flipper, by the way.

The camera angle is palpably wrong. The game field is too short, too wide (not including its ridiculous "wings") and too empty. Table features, when they do occur, seem to have been painted on rather than appearing as 3D objects in their own right. Worst of all, the ball itself seems to move like an ice hockey puck rather than a ball-bearing. Its interaction with the flippers is largely inaccurate (you can balance it on the tip of a flipped flipper – let's see anyone do that in the arcade) and frequently it bounces rapidly between bumpers in a way that most pinball sims forgot ten years ago and reality or gravity never entertained.

If you can bear this monstrously poor game engine, you soon find that the mission structure (which targets have to be hit in which order) is either non-existent or so well hidden that the game is practically impossible to play.

3D Ultra Pinball is terrible, a gimmick-ridden failure outclassed by practically any other game on the Macintosh. On an evolutionary scale, while Empire's *Pro Pinball: the Web* has built spaceships and is about to open its second colony on Mars, *3D Ultra Pinball* is up a tree in the jungle, being deloused by a family member and waving its bright red bum around in a primitive mating display.

On the back of *3D Ultra Pinball's* box it says "Terrific Pinball: one step beyond what you get in the arcade". You could only believe this if you'd never got further than "one step" into an arcade, and never played pinball in one. *3D Ultra Pinball* is only "one step beyond" if that step happens to be over the steep precipice of mediocrity. If you're obsessed with pinball, then possibly – just possibly – at £19.99 this is worth adding to your collection just for its novelty value. If you're serious about your game, however, forget it.

JAMES ASHTON

Alternatively...

Pro Pinball: the Web was reviewed in MACFORMAT 44, where it earned a Classic Award Winning rating of 90%. For details, contact Empire on 0181 343 7337.

The **Command Post** table looks the nicest, but, like the other tables, it's far too short from front to back and lacks any feel of 3D.

3D Ultra Pinball

Almost completely unlike pinball – tinny music, no feeling of 3D and some distinctly non-Newtonian ball movement.

Graphics	**29%**
Sound	**40%**
Gameplay	**25%**

MF rating 27%

PRICE	To be confirmed	**ON SALE**	Now	**CONTACT**	Softline on 0181 401 1234	**WEB SITE**	http://www.softline.co.uk
MAC	**Processor:** 68030 • **RAM:** 4Mb	**POWERMAC**	**Processor:** any • **RAM:** 4Mb	**REQUIRES**	**System:** 7.1 • **Screen:** 640 x 480 • **Colours:** 256 • **Extras:** CD-ROM drive		

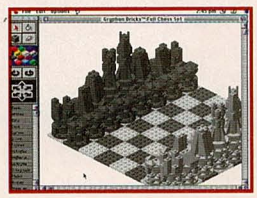
Bricks

You can't stub your toes treading on it or crack your teeth trying to prize it apart... call this Lego™? Actually, it's no relation – but this new game does blast building bricks into the new technological age.

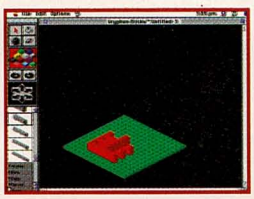
Everyone has fond memories of Lego™, despite the fact that most living-room carpets ever made seem to be able to adopt, chameleon-like, the colour of any small pieces of plastic. Nevertheless, we'd empty our buckets of bits all over it, and delve through thick, dry wads of dust every time we heard the sound of a "one" rattling up the Hoover pipe...

It's not actually licensed by the company, but *Bricks* is a new Lego™-like game that enables you to build objects on your computer screen, without treading on the pieces, running out of the right size ones or losing them for whatever reason. Arriving on CD, it comes in two forms: a children's version with a relatively simplistic interface, big friendly buttons and mercilessly few features; and the adult's version with a more standard floating tool-palette and a more high-powered and professional look.

Each is based on the same process – you create a model in a central window, using a limitless supply of bricks ranging from the bog-standard "fours" and "sixes" to the premoulded bits and weird, angular pieces. This is ideal for a child getting into computers, using the interface designed for younger architects. The only real fly in the virtual ointment is the engine.



Sheeaah! Like anyone's got the patience...



Don't scoff – you'll be seeing a lot of these...

For a start, it's isometric (not drawn in perspective, but at 30-degree angles). This is generally a great way to quickly show 3D, but in this case the gaping hole where a rotation function should be means that you can only view your models from one angle. So how do you build something when you can't rotate it? Answer: with difficulty.

You simply start with a flat base to which you can connect the bricks – like the green base you have in real Lego™. Then, you select your pieces from the palettes – each of which is a category of bricks, linking you to a huge library of over 200 blocks – and place it, using the cursor, onto the board.

In theory, you place each brick where you want it to drop, and it should land on the brick below it. However, it's not quite so simple in practice, because of that isometric system. "Place" is a relative term – there are definite instances when the software will misunderstand your placement. To beat this, it helps to always point to the baseplate (if you can see it), not where you want the brick to go. But this is off-putting and unreliable even for adults. I pity the seven-year-olds.

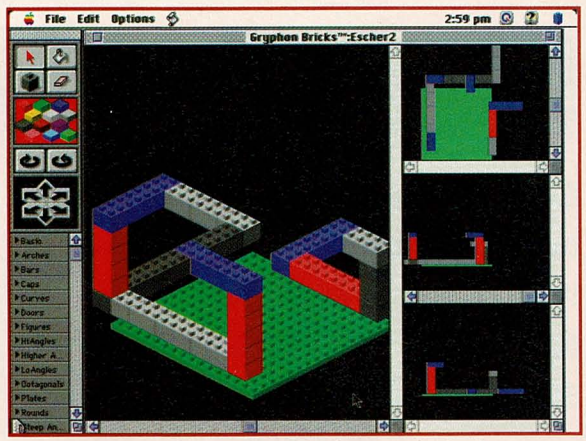
Should you mis-position bricks, though, you'll be comforted to know that there are facilities for removing, rotating and re-colouring them, as well as sliding blocks around within your design. Or even right through it. That's right, *Bricks* has no sense of solidity, which makes the package all the more confusing to use. Combined with the non-rotating engine, this gives you the ability to unintentionally create grotesque crimes of spacial mechanics that'd make Escher turn in his grave. Fun enough, but surely a flaw.

If you get as far as a finished designs, you can paste them into QuickTime movies for animation, but I doubt that *Bricks* will keep your interest long enough for you to discover this.

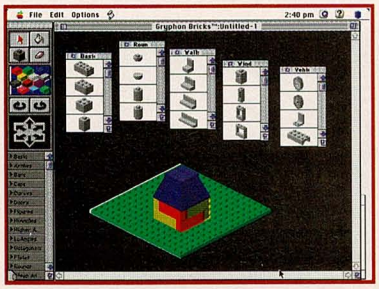
Now don't get me wrong – *Bricks* does give you the chance to construct some enjoyable models, but you'll need an enormous amount of patience. More importantly, there's little satisfaction to be had at the end of it. Surely the joy of real Lego™, aside from the technical achievement in spacial reasoning and artistic interpretation, was that you ended up with a cool toy to play with (or even destroy with impunity)? Virtual Lego™ denies you that – which in itself might not be so bad, if this implementation didn't also deny most of the laws of physics. It doesn't require spacial reasoning so much as spacial derangement.

Bricks' fairly useable interface fails to hide the patience-wearing, obstructive little engine that'll drive any five-year-old to tears. It will also make any older Lego™ fans stare longingly at the example model files, knowing that there's no chance they'll ever achieve some of the constructions contained within.

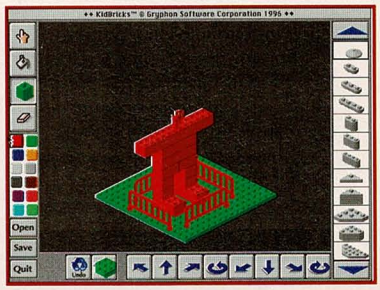
SIMON FORRESTER



Here's one I created earlier. Clever, cunning strategy? No – all these bricks are on the same level – I just slapped 'em down and let the problems with the software create the patterns...



The adult interface with a particularly childish model and floating brick palettes glowering ominously in the background.



The kids' interface. "I can never get the heads right!" At least you don't have to search under the sofa for missing bits...

Bricks

No real sound, an awkward graphics engine and extremely shot-term game play make *Bricks* a less than exciting prospect.

Graphics	**50%**
Sound	**0%**
Gameplay	**40%**
MF rating	**45%**

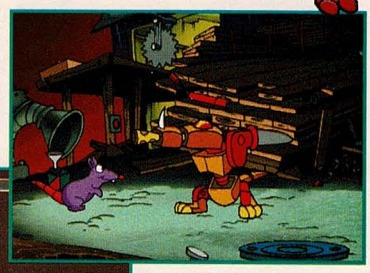
Lego let loose

If you (or your kids) really crave a new kind of Lego™ experience, you can go the Even More Real route rather than the Virtual one and visit Legoland Windsor, a 40 acre theme park based on the (genuine) little coloured bricks. For details, see MACFORMAT 38, or phone Legoland Windsor's enquiry line on 0990 626375.

PRICE	£24.99	**ON SALE**	Now	**CONTACT**	7th Level on 01932 355666	**WEB SITE**	http://www.7thlevel.com
MAC	**Processor:** 68040 • **RAM:** 12Mb	**POWERMAC**	**Processor:** Any • **RAM:** 12Mb	**REQUIRES**	**System:** 7.1 • **Screen:** 640 x 480 • **Colours:** 256 • 2x speed CD-ROM drive		

Battle Beast

At last, the Macintosh gets a beat-'em-up style game. But is it hard enough to make you open your wallet and hand over your cash?



Hardly a fair contest – the player controlling the rat beast has forgotten to turn his character into its fighting form. What an oversight.

Beat-'em-up with a bonus: Morden the turtle, like other Battle Beasts, can also shoot a bullet from his snout.

Were *Battle Beast* a performer, it would certainly be a clown. After all, it does try to amuse. Before, during and after the fighting action in this beat-'em-up, you are treated to quirky full-screen animations just brimming with slapstick humour.

Instead of fighting your way up a ladder of opponents, you must fight the same opponent at six points around this map.

But as clowns go, *Battle Beast* would probably be the type that never quite manages to keep the attention of its audience. The kind of clown which is always on stage just when the food fight breaks out. The sort of clown who is, to put it bluntly, rather pathetic.

You view play from the side, and the basic idea when the fantastic animations have come to an end is to make your character punch and kick his opponent until said adversary's energy points run down to nil. At that point your fighter is declared victorious, awarded bonuses and everything moves on to the next stage.

Toad away

There is a certain amount of justification for all this violence. An evil, robed maniac plans to take over the world and populate it with ugly toads, and you learn from the introductory cartoon sequences that these are out to scare and disgust the children of the world. To stoke your anger further, a drill sergeant appears shouting about how worthless you are and how the toads' leader must be stopped. This, basically, serves as your plot. But it's a beat-'em-up. Any plot will do, right?

After a bout the points are collected. The Beast on the left won, even though he only landed half of his blows.

Part of the problem with *Battle Beast* is that the fighting characters on offer all look pretty much the same. The Battle Beasts, you see, are cuddly toys which can turn into robots to fight. Unfortunately, whether the original critter is a rhino, tortoise or dog, when they mutate into fighting form they look mighty similar. They might have varying colours and horns, but they're all basically the same size and shape. But worst of all, their repertoires of fighting moves are almost identical. There's very little variety in the gameplay.

Variety is further stifled by the game's structure. Instead of getting to fight all the enemy characters in turn, once you've chosen your opponent you have to fight that one six times in a row – once at each of the game's six locations. Following this, you advance to fight against the evil, world-dominating Toad Monster who heads an army of ugly toad minions.

Beastly gameplay

The controls, meanwhile, are on the poor side of average. Responsiveness, so key to a beat-'em-up, is low. Although it appears as though the odd special move is possible (where a series of moves is combined in a magical attack, say), they are difficult to execute. If you do manage to pull one off it's usually by accident.

After its colourful graphics, the best thing about *Battle Beast* is probably its music. While you're fighting, a synthetic symphony builds in tempo, creating quite a sense of tension. Too bad the sound effects aren't powerful enough to create a more combative atmosphere.

One might argue the case for *Battle Beast* by claiming it's a children's game. This will explain why it has a quirky plot, funny animations, and so on. But there's no excuse for *Battle Beast's* very poor level of gameplay. Any child who's had access to *Streetfighter* or *Mortal Kombat* on consoles will recognise clear deficiencies here. It's too repetitive to be interesting and it's hard to play not because it is inherently challenging but simply because the controls are poor. Just because a game is aimed at children doesn't mean it can't be good.

Battle Beast is more than a shame, it's a travesty. The game is, you see, the only pure beat-'em-up available for the Macintosh. Perhaps the Tories are right – when there's no competition the service is pretty poor. **GARRICK WEBSTER**

Battle Beast

Full screen animations and some good music can't disguise a lack of decent gameplay and unresponsive controls.

Graphics	**75%**
Sound	**59%**
Gameplay	**17%**

MF rating 23%

Evil Toad Man awaits...

Before you can fight the final boss, your Beast appears in fluffy toy form and must endure a humiliating sub-game.

Only once you've kicked the spitting toads out of the way can you engage Evil Toad Man in combat. Gripping stuff. Not.

SHAREWARE CENTRAL

Just because programs are cheap, don't assume they're rubbish. Although this month, Rod Lawton did have to search harder than usual to find the pick of the shareware crop...

Actually, many of this month's programs are not shareware but freeware. This is a bit of a novelty these days, and rather refreshing, especially when many of them turn out to be not bad at all.

However, I was obliged to consign not one but three programs to the bin this month. That's because we've been faced with a glut of pop-up calendars. They're everywhere. Gregorian, Julian, System-based, algorithm-based, colour, mono, big, small, useless, uselesser. Gahhh!

Of course, if you're particularly interested in calendars, let us know. We might reconsider, and maybe even run a regular monthly calendar column. Oh, except that MACFORMAT comes out every four weeks – and that means 13 issues in 12 months... On second thoughts, forget it. Perhaps we'll just print train numbers instead, eh?

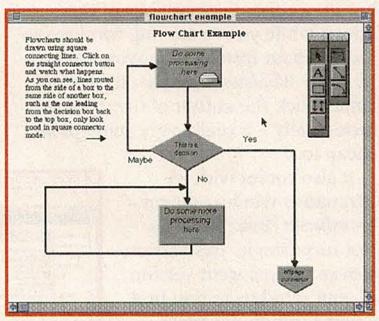
BibleBrowser 1.0

Book
Freeware

If the Bible is something that you pick up only when you go to a wedding or a funeral, then you're not likely to be very interested in an electronic version. But if it's something you study and try to learn from every day, *BibleBrowser* could prove an excellent resource to have.

The whole text of the Bible is stored in individual books, complete with chapters and verse numbers, and you can scroll through each book or jump quickly from one book to another. You can search for specific words or phrases, or you can add bookmarks, giving them names that you choose yourself. It could make the vicar's weekly sermon take half as long to prepare and twice as long to deliver...

And that's about as close as *BibleBrowser* comes to a drawback. The makers say it will work on any Mac, that it doesn't require any fancy Extensions or Control Panels – and you can even customise the display according to the fonts you have installed. Very neatly done.


flowchart example
Flow Chart Example
Flowcharts should be drawn using square connecting lines. Click on the straight connector button and watch what happens. As you can see, lines routed from the side of a box to the same side of another box, such as the one leading from the decision box back to the top box, only look good in square connector mode.
Do some processing here
This is a decision
Maybe
Yes
No
Do some more processing here
empty comment

***Designer Draw 5.0:* an excellent tool for flowcharts, organisation diagrams or anything needing boxes joined with arrows.**

Designer Draw 5.0

Drawing
Freeware

Any old Mac drawing package will enable you to create boxes and join them with lines, so it's not hard to create flow charts, organisational diagrams and labelled illustrations. But if you need to move objects around, create different links or even add levels of detail, you're faced with a lot of tedious and error-prone editing.

Designer Draw enables you to create and link boxes, and using this application they stay linked. So if you're a programmer creating a flow chart, for example, you can move steps out of the way to make room on the screen for new steps, without losing existing links. Similarly, if your company organisation chart needs to be modified to accept an additional vice-principal, you can easily squeeze them in without disrupting the current personnel and department links. In other words, you don't have to go round moving lots of arrows manually and simply hoping that you will get it right – this solves that problem.

Where it gets really clever, though, is that you can "nest" further structures within boxes, so that you could have one diagram providing an overview and then zoom in on additional detail as needed.

To give your diagram a bit of class, you can go for an optional 3D look, mess around with fonts, colours and styles, and even paste in images from the Clipboard. And what do you pay for this miniature masterpiece of programming? Absolutely nothing.

Try out all of these programs on our Cover CD.

Dos and don'ts

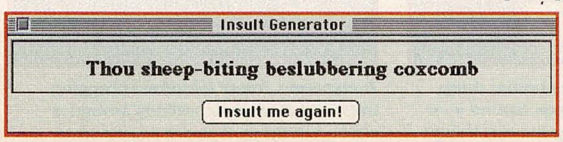
The life of a shareware reviewer isn't all fast cars and glamour, you know. This month's margin notes tell the secrets of the dos and don'ts of shareware.

Insult Generator 1.0

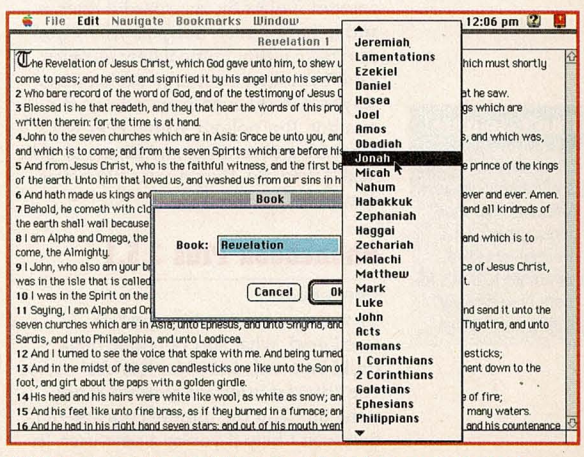
Insults
Freeware

"Thou venomed common-kissing hedge-pig". Ouch. "Thou tickle-brained reeling-ripe harpy". Ooh, I say. "Thou tickle-brained folly-fallen canker-blossom". Oh, now really.

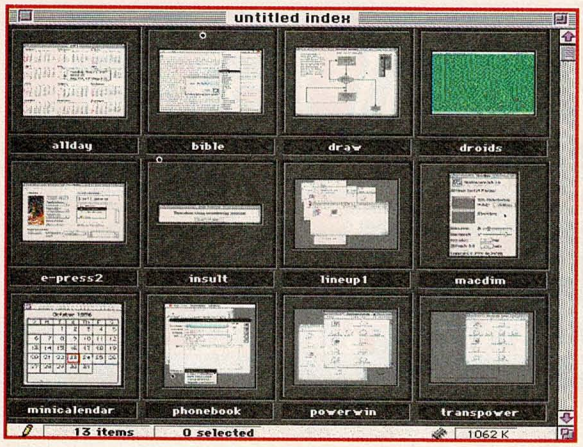
Nobody likes being insulted, especially by someone they've never even met before – and yet here's a program that



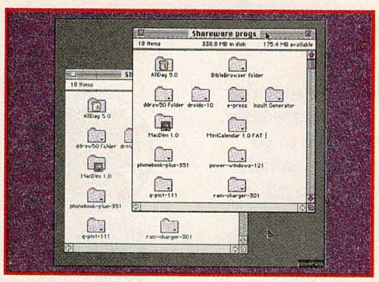
***Insult Generator 1.0:* is this really a fitting use for £2,000-worth of Macintosh equipment?**



***BibleBrowser 1.0:* a no-frills and really rather good electronic Bible, useful if you obtain your spiritual guidance on a daily basis.**



QPict 2.1.1: drag a whole folder full of files onto its icon, and this forward-looking program will sort out all the pictures and display them as thumbnails in a single window. Innovative stuff.



Double-click on a *QPict* thumbnail to see the image full-size. Alternatively, drag thumbnails from a *QPict* window into Finder windows, and the files themselves will then move to the new location. Clever.

does nothing else. However, rather than just stooping to modern-day profanity, it clothes its venomous onslaughts in a veil of flowery medieval gobbledegook, so that you never quite know what you're being accused of or compared to.

The author is quite clearly an onion-eyed toad-spotted hedge-pig.

Do explain...

...precisely what your program does. Don't just supply a list of all the updates since version 1.0 and the bugs they fixed – nobody will know what you mean!

MacDim

Screensaver
Freeware

The Mac market is saturated with screensavers. Flying shapes, jumping animals, migraine-inducing patterns... and what for? Just to stop your screen from suffering burn-in? What a load of nonsense. What's needed is for someone to write a Control Panel that simply dims your screen after a preset time. Of course, it would be nice to be able to control the amount it dims by, the speed it dims at and to have screen hotspots where you can make it dim immediately or never. And if you had an energy-saving Mac, maybe it could even power-down the monitor. But nobody would ever write something so sensible and simple as this. And if they did, they'd certainly never distribute it as freeware.

Don't assume..

...that your software is blindingly obvious. A readme file that goes "grpspd1.1.1 de-resolves alias parameters, that's all there is to it really" is all too common.

Phonebook Plus 3.5.1

Phonebook
Shareware, registration fee $45

Good grief, what sort of phone book could be worth $45? Not this one, sadly. The "slickest interface around" is anything but, and the minimal documentation won't help if you're a new user. In its favour, *Phonebook Plus* is a fast and efficient way of storing names, addresses and notes. However, its label-printing and call-logging functions would be a lot more useful if they came with proper instructions. As it is, you could spend hours switching between *PhoneBook*, Balloon Help and the ReadMe file, trying to figure it out. It looks old, it's too hard to fathom and it costs far too much. Next contestant please...

Power Windows

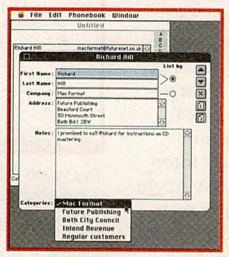
System utility
Shareware, registration fee $5

Power Windows is a 9K System Extension that changes the way your Mac windows look when you move them. Usually, a dotted window outline follows your mouse cursor until you release the button and the window takes up its new position. With *Power Windows* installed, the window itself moves, rather than just its outline. It also stays visible in its previous position, but greyed out.

There are other similar utilities about, but they either wipe out bits of the screen while you're moving windows or judder about instead of moving smoothly. *Power Windows*, though – from Greg Landweber, the author of *Greg's Buttons*, incidentally – is really very smooth, and cheap too.

It also comes with an alternative window mover – *Translucent Power Windows*. Not surprisingly, this version moves a translucent version of your window as you find a new location. It's more processor-intensive, though, and starts getting a little jerky with big windows.

For the $5 registration fee you get both versions. Two cool pieces of programming at one cool price. Cool.

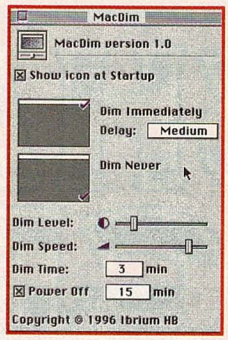


***Phonebook Plus 3.5.1:* a natty little phone book and a complicated call-logger that needs far better instructions.**

QPict 2.1.1

Graphics utility
Shareware, registration fee $25

If you regularly handle large numbers of images, you'll know what a nuisance it is having to sort them all out. Quite often, you can't tell what they are from the filenames, and opening them up one-by-one to check takes an absolute age. *QPict2.1.1* solves this problem by creating indexes of pictures, including thumbnail previews if



***MacDim 1.0:* it dims your screen by an amount you choose, at a speed you choose, after a delay you choose. Simple and effective.**

you want. Simply double-click on the preview and you can see the full image.

Creating an index is easy. Just drag the contents of a folder containing the images (even if not all of the contents are images) into the *QPict* window and it will display thumbnails of all the images it finds. These images can come from different folders, so you can create an index of images from many locations.

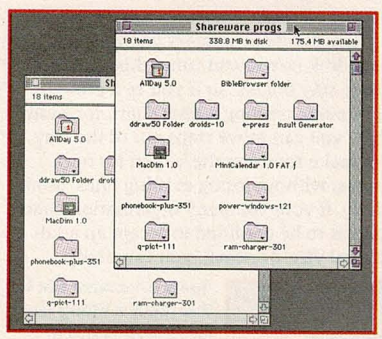
The really clever bit comes next. You can sort out images within *QPict* and move them to new locations. By dragging them out of the *QPict* window and into a folder on the Finder, you move the full image file itself to that new location. And if you then hold down **[command]** and drag the thumbnails, they disappear from the index as the files themselves are moved. This makes *QPict* an excellent tool for both sorting and filing large numbers of images.

There are further enhancements on the way, including the use of helper applications for JPEGs and also other, more esoteric file formats. Meanwhile, *QPict* is still an excellent tool for using with PICTs. This is definitely an application worth keeping an eye out for in the future.

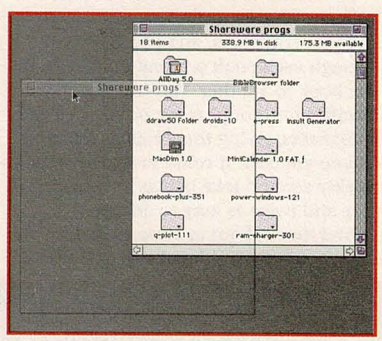
RAM Charger 3.0.1

System utility
Demo, registration fee $39.95

No matter how much memory you've got, it's never enough. And even though you ought to have heaps of memory left over, sometimes your applications insist there's not enough left for them to



***Power Windows 1.2.1:* why bother dragging dotted window outlines around your screen when you can drag the real thing?**



***Transparent Power Windows:* dragging translucent window outlines around is cool – but tiring, if you're a processor.**

launch. And even when you do have enough memory to run your favourite apps, they keep dumping you out with fatal memory errors. What's going on?

You can blame programmers for your Mac never having enough memory. The more memory computer manufacturers install, the more programmers use. Gone are the days when *Word* would run in half a megabyte – you now need a truckload of SIMMs before it can even croak out a title-screen. And the same applies to just about any other major application.

As for your applications insisting that there's not enough spare RAM when you know darned well there is, that's because of what's known as memory "fragmentation". Your applications use memory in great lumps, and when you quit them, the other programs currently running don't shuffle up to take up the space – they simply stay where they are.

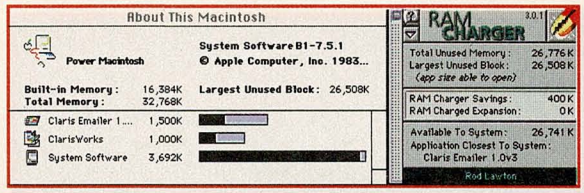
So, after you've had a spell of launching and quitting, you find your vast expanse of memory broken up into unusable small fragments, with constant restarts being your only solution. As for your Mac continually crashing with memory errors – well, that's just your Mac, I'm afraid. Some versions of the System are buggier than others, and some applications have more stable memory handling than others.

Well it so happens that *RAM Charger* can do something about all three of these problems. It continually monitors the memory usage of running applications, and frees up spare RAM – that's the difference between how much RAM the application's actually using and how much you've allocated to it in the **Get Info** box (under **File** in the Finder).

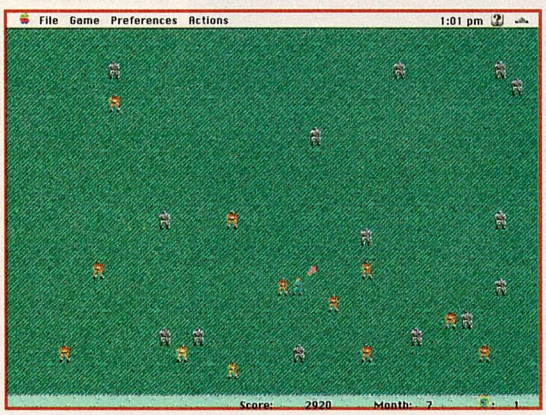
RAM Charger also relocates RAM continually, making sure that your free memory is in a single block, not broken up into bits. So you get more free memory, and it's unfragmented. The maker also reckons that *RAM Charger* makes your RAM much more stable and that you get fewer memory-related crashes.

RAM Charger is a commercial application, but the maker has taken the most unusual step of releasing a fully-enabled demo version. Fully-enabled, that is, for a period of seven days. If you want it to carry on working after that, you have to fork out the dosh. It's a smart idea from the maker, Syncronys, because it gets the application lots of coverage and user-interest, and it doesn't cost a bean in distribution. Find the Syncronys Web site at **http://www.syncronys.com**.

RAM Charger is going to be most useful if you're struggling along with an 8Mb machine (it's compatible with Virtual Memory and memory-doubling software) – but if it does provide more stable memory handling, then it's going to prove popular (and perhaps indispensable) if you're a power user too.



***RAM Charger 3.0:* it optimises your unused RAM, it defragments your memory, it makes your Mac crash less, and you can try it free for seven days. A nifty application.**



***Droids 1.0:* Take the ancient Mac game *Daleks*, chuck in some sprites, mix in a bit of colour, then give it a bizarre and unrelated plot. And – hey presto! – very nearly a new idea.**

Droids 1.0

Game
Shareware, registration fee $15

The time: the year 2048. The place: Terra. The problem: androids are taking over the world. The other problem: the gameplay is strangely familiar.

Cast your mind back to the days when Macs were no larger than lunch boxes, and *MacPaint* was the industry's leading image manipulation package. When one-bit graphics were state of the art and the 68000 was cutting edge microprocessing. If you can remember that far back, you may also recall a primitive but addictive

Do make...

...allowances for international copyright. Custom icons based around famous cartoons characters are one example – publishers get huffy about this, and the law can be nasty too.

Loose threads?

If you don't have *Thread Manager*, you can get hold of it on the Web at: **ftp://ftpdev.info.apple.com/Developer_Services/../Technical_Documentation/Toolbox_Assistant_Updates/Thread_Manager.qv.sit.hqx**

ePress 4.0

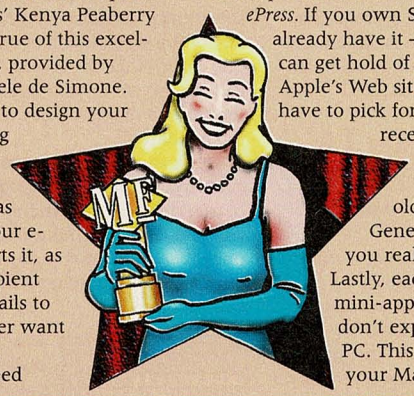
E-mail
Freeware

They say the best things in life are free, and although that's never been true as far as I can see of Porsche 911s, Special Brew or Carwardines' Kenya Peaberry Special Reserve, it's true of this excellent little application, provided by Italian student Gabriele de Simone.

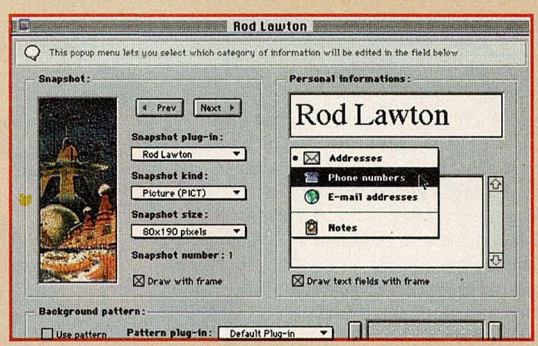
ePress enables you to design your own electronic calling cards. You send them along with your e-mails, either as an enclosure or, if your e-mail software supports it, as a signature. The recipient then has all your details to hand in case they ever want to contact you again.

The cards don't need another application to open them, they take up a mere 34K or so, and they look wonderful. You can include pictures or icons and a pop-up menu enables recipients to view your address, phone number, e-mail address and any other notes you want to add.

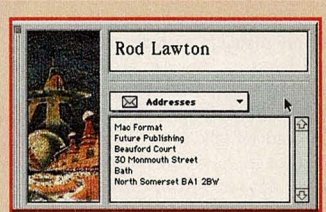
There are, however, a few limitations. First, you need *Thread Manager* to run *ePress*. If you own System 7.5 you'll already have it – if you don't, you can get hold of a copy of it from Apple's Web site. Second, you do have to pick fonts that the receiver of your mail is likely to have. That limits you to old favourites like Geneva, Times and – if you really must – Chicago. Lastly, each *ePress* "card" is a mini-application in itself, so don't expect it to work on a PC. This is a treat that only your Mac-owning pals will be able to enjoy. *ePress* is easy to use, it looks wonderful, is very useful, and on top of all that, it's a disarmingly simple idea. Excellent.



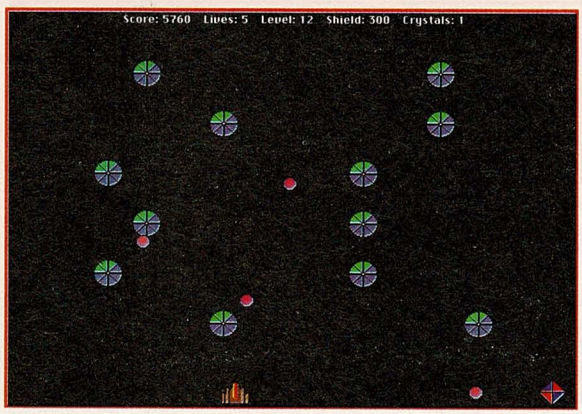
Star of the month



***ePress* electronic cards can have pictures, logos, icons and pop-up menus for your address, telephone number and e-mail details.**



***ePress 4.0:* a super-cool way to create electronic calling cards – they're only 34K and yet they're standalone applications. Nifty.**



Star Chaos 1.3: **a kind of cross between *Space Invaders, Galaxians* and John Major: an updated blast from the past, and a tad grey...**

little game called *Daleks*. It took place on an invisible grid where you could move left, right, up, down or in any one of the diagonal directions. Unfortunately, so could the Daleks that were chasing you. The only way to destroy them was by making them crash into each other, or into the rubble left behind by previous collisions. If you got touched by a Dalek you were dead – unless you still had a bit of charge left in your sonic screwdriver.

Well, substitute androids for Daleks, substitute force fields for sonic screwdrivers and substitute colour for one-bit mono and you've got *Droids*. Amazing, eh? It's fun, in a stone-age kind of way (the old ones are the oldest and all that) – but it's also a fantastic waste of whatever processor you've got twiddling its thumbs in the middle of your Mac.

The programmers say that if you send them the $15 shareware fee it'll encourage them to keep going. Hmm – don't tempt me...

Don't...

...charge silly sums of money for registering shareware, because it's the best way to make sure that you won't get it.

Space Debris 1.4

Game
Shareware, registration fee £15

This must be retro-week in the world of shareware because yet another classic Mac antique has resurfaced wearing new clothes. This time it's the wonderful *Crystal Quest* that has been cloned, spruced up and sent back to torment another generation of Mac-gamers.

Sadly, although *Space Debris* is more colourful with bigger sprites, it doesn't have the same repertoire of sounds as the original – and it certainly doesn't move with quite the same breakneck speed and split-second decisive urgency. You could tool around all day with *Space Debris* in fact, picking up points, avoiding mines and shooting aliens – and you could do it without once hitting the 200 beats-per-minute pulse rate which was a permanent fixture of *Crystal Quest*.

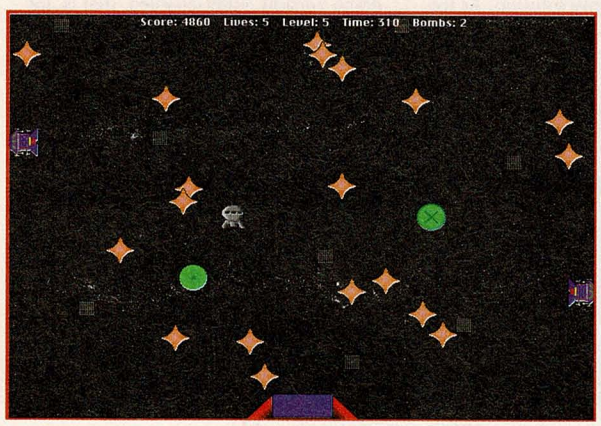
It looks nice, but the original was definitely meaner and harder. Also – and it pains me to say it – like most of the early Mac applications, we'll probably never see its like ever again.

Star Chaos

Game
Shareware, registration fee £15

Also from the author of *Space Debris* comes *Star Chaos*, yet another updated blast from the past. This one is based on a cross between *Space Invaders* and *Galaxians*, with a little bit of the Amiga game *Plutos* thrown in. Sadly, it's again prettier but far tamer. The original *Space Invaders* may have had no colour and pathetic sprites, but it had the ability to set the pit of your stomach beating in time with the thunderous, terrifying and inexorable advance of the aliens. The original *Galaxians* too had an eerie screeching horror about it that's been missing from every one of its clones since.

Star Chaos looks nice, but it's got no soul. It's not hard to stay alive and not terribly distressing when you don't. You can't say that about *Space Invaders*. **MF**



Space Debris 1.4: **remember *Crystal Quest?* Prepare to wipe away a tear of nostalgia as you play this colourful but pale imitation.**

It's a date...or several

AllDay v5.0

Calendar
Freeware

Here's a little general knowledge quiz. On what date does Good Friday fall in 1998? No, you can't go and check your diary. Okay, sit and try to work it out if you want to. No? Tricky, isn't it? If only you'd had *AllDay* installed on your Mac when we asked you that, then you could have been really smart...

AllDay is an application that simply displays a yearly calendar in a window. You can go forward or back through the years and click on a day to find out which week of the year it's in, as well as how many days it is from the start and end of the year. You can also add religious and public holidays, which then show up in red on the calendar, or even add your own custom holidays, birthdays and the like.

And that's about it, really. Except that if you're a calendar-head you'll be interested to learn that *AllDay* doesn't use the Mac's own date-tracking system because that can't calculate week numbers. And it only supports the Gregorian calendar, but sadly not the chants – or the Julian calendar. So what use is that, eh?

In the bin

MiniCalendar 1.0

Calendar
Shareware, registration fee $10

Here's another calendar, and one that can display dates from 250 billion years BC to 68 trillion years AD, or thereabouts. You can move forward and back a year at a time or a month at a time, go to a specific month or year and quickly get back to today's date when you've done all that you could possibly want to do. I always thought that time-travelling wasn't all that exciting – and this proves it. $10. Bargain. Not.

SimpleDate 1.4

Calendar
E-mailware

Another calendar application? Yup. Designed specifically for those who need to know what day of the week it will be on March 30th 2073. You can change the display style, go to a specific month or year and go back or forward a month at a time. You can also go straight to today's date.

What about storing memos attached to specific days, or banners for holidays, or some way of marking religious and public holidays? Nope. But you can open more than one window at once. There is just one more question that now needs answering: what would you actually use this program for?

MiniCalendar 1.0: **what a smart idea – a pop-up calendar that, er, um, well, pops up. And that you can look at as, er, often as you like. Hundreds of uses, see?**

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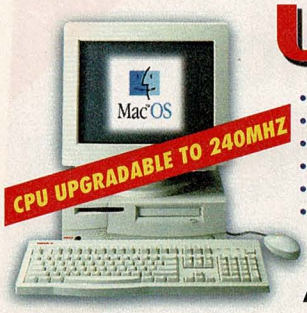

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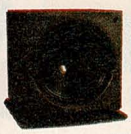

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Which monitor?

Maybe your new Mac doesn't come with a monitor, or maybe the one you've got is no longer any good? Either way, check out MACFORMAT's guide to choosing your next Macintosh display, with Rod Lawton as your host.

Although Performa models are usually sold with a monitor in the bundle, some suppliers will still sell you Mac and monitor separately. This doesn't necessarily put you at a financial disadvantage, and it means you can choose exactly the monitor you want. If you're buying a PowerMac, you will be choosing one anyway. This being the case, you need to be armed with a few facts before you sign on the dotted line...

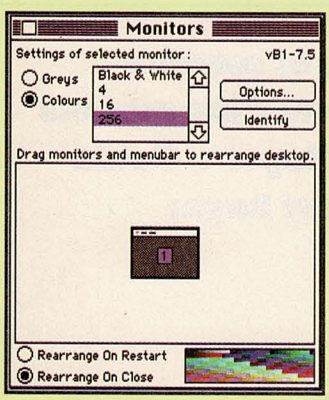
Bigger isn't always best

It's true that the bigger the monitor, the less you'll have to squint at the display, and the more you can get on the screen. But bigger monitors cost a lot more money, and they take up more space. For home use, where both are usually at a premium, a 15-inch multiscan model will usually be perfectly adequate.

Most machines are sold with 15-inch monitors, and it's by far the most popular compromise between price and performance. You may also be offered a 14-inch Trinitron model at a similar price. You get a correspondingly smaller screen display, but the quality is higher.

Moving up in size, after 15 inches the next popular size is 17 inches. This might not sound like a big jump, but measure for measure, you do get a screen area that's around 28 percent bigger. This is the most popular choice for professional users who have to stare at it all day.

If you're a real graphics or DTP pro, you might even stretch to a 21-inch monitor. These give you a vast space to work in, but do leave a correspondingly vast hole in your wallet. You will also almost certainly need to upgrade your Mac to cope. Check out the "Got enough VRAM?" box for more information.



Your Mac's Monitors Control Panel will show you when you're running short of VRAM by restricting the number of colours you can display.

What's multiscan?

There's an important distinction to be made between monitor size and resolution. A monitor's resolution is the total number of pixels it displays, quoted as the horizontal number by the vertical number. The 14-inch Apple monitor's resolution, for example, is 640 x 480. The resolution is governed by the construction and the number of horizontal scans it makes as it builds the picture.

Multiscan monitors can vary the rate at which they scan, though, and hence the resolution of the display. Most 15-inch models, for example, can display at resolutions of 640 x 480, 832 x 624 and even 1,024 x 768.

There's no intrinsic disadvantage to having a multiscan monitor instead of one of the more traditional fixed-resolution Apple monitors. Indeed, it's pretty hard these days to buy a non-multiscan monitor, and they do offer the advantage of variable resolution. Hand in hand with that, though, are certain limitations to be aware of. It's tempting to assume that setting a multiscan monitor to its highest resolution will give you the best results, but there are important disadvantages to high resolutions.

First, your Mac's interface is built using window borders, title bars and buttons whose sizes are based on pixels. So if you set a 15-inch monitor to a resolution of 1,024 x 768, it can start to get very hard to position the mouse precisely enough to open and close windows, click on dialogue buttons and so on.

This is tied in with the second problem – high resolutions push the performance of your monitor to the very limit. Unless the monitor's engineering is of the highest quality, the electron guns which scan the screen might not be aligned absolutely perfectly. This might not matter at lower resolutions, but preciciosn is vital at higher ones and the definition of individual pixels can start to "slip" and the display develops a "mushy" feel.

The display can get flickery too,

The AppleVision 1705 and AppleVision 1710 are both 17-inch multiscan monitors, but the 1705 is £165 cheaper than the 1710 – why? It's the difference in cost between the mediocre FST tube in the 1705 and the superb Trinitron tube in the 1710.

For the ultimate in picture quality, you need Trinitron tube technology – as used by Sony for its multiscan 15sfII and 17sfII models.

Mac or PC

Most monitors you can buy (except those manufactured by Apple) are primarily designed for PCs, yet they will work perfectly well with Macs too.

The difference lies in the output of the two machines. PCs have a VGA connector while Macs connect to their monitors via an RGB port. When you're buying your new monitor, you need to specify that it's for a Mac. Most manufacturers will supply the necessary adaptor (at a cost of around £15-25). If not, adaptors are available separately.

You might want to check, too, that the monitor comes with Control Panel software for the Mac. While the majority of adjustments can often be made via knobs on the front of the display, some settings may only be accessible via appropriate software control.

as the monitor struggles to make all those additional scans across the screen while maintaining the "refresh rate". This is the rate at which the electron guns scan the screen to update the display – typically around 60Hz to 100Hz (60 to 100 times a second) – if your monitor is set to a higher resolution, it has to fit more lines of scans in but still get to the bottom of the screen in the same time.

Fourth, it's your Mac that has to create the image that your monitor displays, which means calculating a colour value for every pixel in the display. The higher the resolution, the greater the number of pixels and therefore the more processing your Mac has to do – and there's only so much it can cope with.

You want colour too?

To map out the display your Mac uses "video RAM" or VRAM – special memory set aside for just this purpose. Your Mac's VRAM has to be large enough to hold a single, full screen image, and this means holding colour information for each pixel in that image.

Clearly, the more pixels there are, the more VRAM you need. However, if you want to display thousands or even millions of colours, rather than the basic 256, you need more still. This is because each pixel needs more memory to record its unique colour. If you've heard terms like "24-bit colour", here's how it ties in:

4-bit	16 colours
8-bit	256 colours
16-bit	65,536 ("thousands")
24-bit	16.7 million("millions")

To display 256 colours, you need eight bits of VRAM for each pixel, but for millions of colours you need three times as much. This is why, when you increase the resolution of your display to the point where your Mac is running out of VRAM, it reduces the range of colours you have available.

Some Mac models enable you to add more VRAM, but with others you may have to buy a graphics card. These usually consist of both a processor to speed up graphics handling and some more VRAM.

Which tube technology?

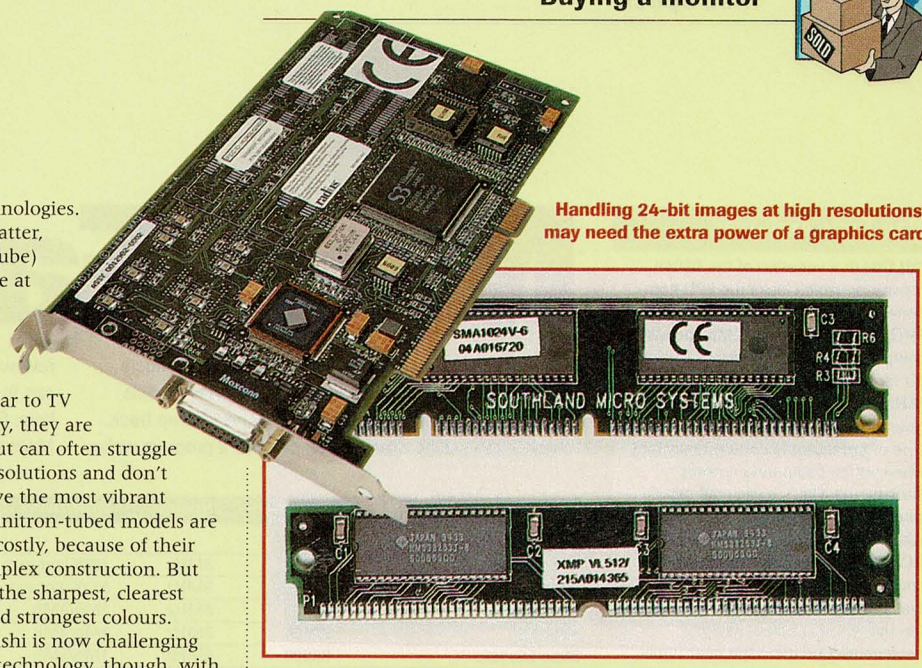
What does FST mean? Are Trinitron tubes really better than all the rest? How do Diamondtron tubes work?

Needless to say, every monitor manufacturer insists that its own products are the best that money can buy, and that they use the latest technology to achieve miraculous results. It is possible, though, to generalise about the sort of quality you'll get from the three main technologies.

FST (Flatter, Squarer Tube) models are at the cheap end of the market. Basically similar to TV technology, they are sharper but can often struggle at high resolutions and don't always give the most vibrant colour. Trinitron-tubed models are the most costly, because of their more complex construction. But they give the sharpest, clearest images and strongest colours.

Mitsubishi is now challenging Trinitron technology, though, with its own Diamondtron tube. While most reviews put the Trinitron monitors narrowly ahead, Diamondtron models certainly appear to offer performance superior to that of FST monitors.

For a selection of the best monitors reviewed recently in MACFORMAT, turn to page 121 – do shop around for the best prices. For more details, see our huge group test of 18 of the latest 15- and 17-inch screens in MACFORMAT 40. And if you want to keep up with one of the fastest moving areas of computer technology, take a look at our introduction to flat panel displays in MACFORMAT 44. If you missed either of these issues, turn to page 134 of this one for information on how to get hold of a copy.



Handling 24-bit images at high resolutions may need the extra power of a graphics card.

If your Mac doesn't have enough VRAM to display lots of colours at high resolutions, extra VRAM may be the answer. But check the table in the "Got enough VRAM?" box, to see if your Mac can take it.

Got enough VRAM?

Your Mac doesn't just need enough Video RAM to cope with your display's resolution and colour depth, it needs the processing grunt to re-calculate each pixel in that display many times per second. That's why more VRAM alone may not be enough, and why you might need to fit a graphics card. Indeed, if your Mac isn't on this list you can't add more video RAM. Instead you'll have to invest in a graphics card. See this issue's group test, starting on page 58, for details.

It's easy enough to work out how much VRAM you need when you know the resolution and colour depth you want from your monitor. Here is the formula:

VRAM required (in kilobytes) = resolution x bit-depth/8192

For example, a 17-inch monitor running at 1,024 x 768 in thousands of colours (16 bit colour) will need 1536K of video RAM.

These are the Mac models which can accept extra video RAM:

Mac	standard VRAM	maximum VRAM
Colour Classic	256K	512K
LC	256K	512K
LCII	256K	512K
LCIII	512K	768K
LC475	512K	1Mb
Mac IIvx	512K	1Mb
Mac IIvi	512K	1Mb
Quadra 610	512K	1Mb
Quadra 650	512K	1Mb
Quadra 700	512K	2Mb
Quadra 800	512K	1Mb
Quadra 840AV	1Mb	2Mb
Quadra 900	1Mb	2Mb
Quadra 950	1Mb	2Mb
PowerMac 7200	1Mb	4Mb
PowerMac 7500	2Mb	4Mb
PowerMac 8500	2Mb	4Mb
PowerMac 9500*	2Mb	4Mb

*** The PowerMac 9500 uses a graphics card with on-board VRAM slots. The 7100 and 8100 come with pre-installed graphics cards and don't use VRAM.**

Inside the Buyer's Guide...

All the information you need to make the right buying decision!

Complete guide to Mac models
What chip is in your Mac? How much RAM can you add? Whether you need to know if your Mac can run a piece of software we've reviewed or you want to find out how much you can expand it, all you need to know is here... 116

The MACFORMAT Buyer's Guide
Your authoritative guide to the best hardware and software buys, based on MACFORMAT's own indpendent tests.

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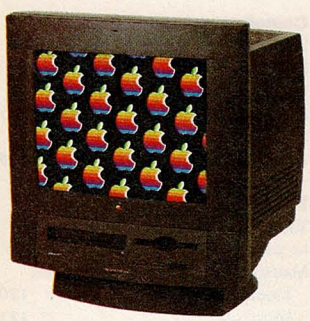
Mac Facts explained

68LC040: a variation of the 68040 processor, which lacks the FPU component its relative enjoys.
FPU: the Floating Point Unit speeds up complex maths calculations – useful for 3D for example.
MHz: a processor's megahertz rating gives an indication of its speed, but the type of processor is equally important when you're comparing models.
NuBus: the Mac's traditional expansion slot. Outdated now, but there are still plenty of cards available.
PCI: Peripheral Component Interconnect is the expansion standard that's replaced NuBus – faster, cheaper (on the whole) and not likely to become redundant in the near future.
PC Card: formerly known as PCMCIA, it's the industry-standard expansion slot for portables. Lots of options.
PDS: the Processor Direct Slot is often used to upgrade your Mac's processor, but you can get other types of card too.
PPC: PowerPC is the standard processor for all Macs nowadays. Broadly speaking, the 604e is the fastest, with the 604, 601, 603e and 603 trailing it – but compare those MHz ratings too.

Apple Family Macintosh



For the past few years, Apple has been marketing a range of user-friendly beginner machines alongside its mainstream PowerMacs. These easy-to-use Performas have proved very popular in the High Street, thanks to their all-in-one hardware bundles and the huge amount of software you get – typically *ClarisWorks,* several multimedia reference and entertainment titles and other assorted programs.

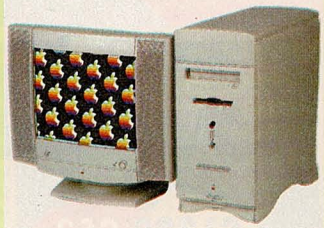
Apple's latest move, though, is to target these machines at specific types of user, as demonstrated by the new Performa 5400/180 Family Mac. Unusually for a Mac, it has an all-black finish, which should help it blend in with the TV, VCR and hi-fi in the lounge. As well as general productivity software like the ubiquitous but reliable *ClarisWorks,* you get a built-in modem and the *Apple Internet Connection Kit,* the closest to an instant Internet connection that any company has so far manged to offer. There's also a TV tuner card and remore control so you can watch your favourite TV programmes in private while the rest of the family congregates around the inevitable soaps on your "real" TV.

Mac Facts

What processor is in your Mac? How much RAM can you add? With so many models over the years, it can be hard to keep track. Whether you want to know if you can use a program we've reviewed this issue or need to know what upgrades you can fit, our complete table of every Mac model ever should help. Current models are coloured blue-green – see MACFORMAT 42 for tests of many models.

Model	Processor	Speed	RAM/Max RAM	Expansion	FPU	Price
Compact Macs						
Mac 128K	68000	8MHz	128K/not exp	None	No	N/A
Mac 512K	68000	8MHz	512K/not exp	None	No	N/A
Mac Plus	68000	8MHz	1Mb/4Mb	None	No	N/A
Mac SE	68000	8MHz	1Mb/4Mb	1 PDS	No	N/A
Mac Classic	68000	8MHz	1Mb/4Mb	None	No	N/A
Mac SE/30	68030	16MHz	1Mb/128Mb	1 PDS	Yes	N/A
Classic II (= Performa 200)	68030	16MHz	2Mb/10Mb	None	Optional	N/A
Color Classic	68030	16MHz	2Mb/10Mb	1 LC-PDS	Optional	N/A
Mac II Series						
Mac II	68020	16MHz	1Mb/68Mb	6 NuBus	Yes	N/A
Mac IIx	68030	16MHz	1Mb/128Mb	6 NuBus	Yes	N/A
Mac IIcx	68030	16MHz	1Mb/128Mb	3 NuBus	Yes	N/A
Mac IIvi	68030	16MHz	4Mb/68Mb	3 NuBus	Optional	N/A
Mac IIsi	68030	20MHz	1Mb/65Mb	1 NuBus/PDS	Optional	N/A
Mac IIci	68030	25MHz	1Mb/128Mb	3 NuBus	Yes	N/A
Mac IIvx (= Performa 600)	68030	32MHz	4Mb/68Mb	3 NuBus	Yes (not 600)	N/A
Mac IIfx	68030	40MHz	1Mb/128Mb	6 NuBus, 1 PDS	Yes	N/A
LCs						
Mac LC	68020	16MHz	2Mb/10Mb	1 LC-PDS	Optional	N/A
Mac LC II (= Performa 400)	68030	16MHz	4Mb/10Mb	1 LC-PDS	Third-party	N/A
Mac LC III (= Performa 450)	68030	25MHz	4Mb/36Mb	1 LC-PDS	Optional	N/A
Performas (non-PowerPC)						
Performa 475 (= LC475)	68LC040	25MHz	4Mb/36Mb	1 LC-PDS	Upgrade	N/A
Performa 630 (= LC630)	68LC040	33MHz	4Mb/36Mb	1 LC-PDS	Upgrade	N/A
Centris series						
Centris 610	68LC040	20MHz	4Mb/68Mb	1 NuBus/PDS	Upgrade	N/A
Centris 650	68040	25MHz	4Mb/136Mb	3 NuBus, 1 PDS	Yes	N/A
Quadra series						
Quadra 610	68040	25MHz	4Mb/68Mb	1 NuBus/PDS	Yes	N/A
Quadra 660AV	68040	25MHz	8Mb/68Mb	1 NuBus/PDS	Yes	N/A
Quadra 700	68040	25MHz	4Mb/64Mb	2 NuBus, 1 PDS	Yes	N/A
Quadra 900	68040	25MHz	4Mb/256Mb	5 NuBus, 1 PDS	Yes	N/A
Quadra 650	68040	33MHz	4Mb/136Mb	3 NuBus, 1 PDS	Yes	N/A
Quadra 800	68040	33MHz	8Mb/146Mb	3 NuBus, 1 PDS	Yes	N/A
Quadra 950	68040	33MHz	8Mb/256Mb	5 NuBus, 1 PDS	Yes	N/A
Quadra 840AV	68040	40MHz	8Mb/128Mb	3 NuBus	Yes	N/A
PowerMac Performas						
Performa 5200	PPC 603	75MHz	8Mb/64Mb	1 PDS	Yes	N/A
Performa 5260	PPC 603	100MHz	12Mb/64Mb	1 PDS	Yes	**£1,385**
Performa 6320	PPC 603	100MHz	12Mb/64Mb	1 PDS	Yes	**£1,475**
Performa 6200	PPC 603e	75MHz	8Mb/64Mb	1 PDS	Yes	N/A
Performa 5300	PPC 603e	100MHz	8Mb/64Mb	1 PDS	Yes	N/A
Family Mac 5400/160	PPC 603e	160MHz	16Mb/136Mb	1 PCI	Yes	**£1,804**
Family Mac 5400/180	PPC 603e	180MHz	16Mb/136Mb	1 PCI	Yes	**£2,133**
Home Office 6400/180	PPC 603e	180MHz	16Mb/36Mb	2 PCI	Yes	**£2,033**
Home Office 6400/200	PPC 603e	200MHz	16Mb/136Mb	2 PCI	Yes	**£2,314**
Power Macintoshes						
PowerMac 6100/60	PPC 601	60MHz	8Mb/72Mb	1 NuBus/PDS	Yes	N/A
PowerMac 6100/66	PPC 601	66MHz	8Mb/72Mb	1 NuBus/PDS	Yes	N/A
PowerMac 7100/66	PPC 601	66MHz	8Mb/136Mb	3 NuBus, 1 PDS	Yes	N/A
PowerMac 7200/75	PPC 601	75MHz	16Mb/256Mb	3 PCI	Yes	N/A
PowerMac 7100/80	PPC 601	80MHz	8Mb/136Mb	3 NuBus, 1 PDS	Yes	N/A
PowerMac 8100/80	PPC 601	80MHz	8Mb/264Mb	3 NuBus, 1 PDS	Yes	N/A
PowerMac 7200/90	PPC 601	90MHz	16Mb/256Mb	3 PCI	Yes	N/A
PowerMac 7500/100	PPC 601	100MHz	16Mb/512Mb	3 PCI, 1 PD	Yes	N/A
PowerMac 8100/100	PPC 601	100MHz	8Mb/264Mb	3 NuBus, 1 PDS	Yes	N/A
PowerMac 8100/110	PPC 601	110MHz	8Mb/264Mb	3 NuBus, 1 PDS	Yes	N/A
PowerMac 8200/120	PPC 601	120MHz	16Mb/256Mb	3 PCI	Yes	**£1,526**
PowerMac 8500/120	PPC 604	120MHz	16Mb/512Mb	3 PCI, 1 PD	Yes	N/A

Model	Processor	Speed	RAM/Max RAM	Expansion	FPU	Price
PowerMac 9500/120	PPC 604	120MHz	16Mb/768Mb	6 PCI, 1 PD	Yes	N/A
PowerMac 9500/132	PPC 604	132MHz	16Mb/768Mb	6 PCI, 1 PD	Yes	N/A
PowerMac 7600/132	PPC 604e	132MHz	16Mb/512Mb	3 PCI	Yes	£2,056
PowerMac 8500/180	PPC 604e	180MHz	16Mb/512Mb	3 PCI	Yes	£2,879
PowerMac 9500/200	PPC 604e	200MHz	32Mb/768Mb	6 PCI	Yes	£3,378
PowerMac 9500/180 MP	4xPPC 604e	180MHz	32Mb/768Mb	6 PCI	Yes	£4,171
DayStar Mac-compatibles						
Genesis MP400+	2xPPC 604e	200MHz	0Mb/1.5Gb	6 PCI	Yes	£4,994
Genesis MP600	4xPPC 604e	150MHz	0Mb/1.5Gb	6 PCI	Yes	N/A
Genesis MP720+	4xPPC 604e	180MHz	0Mb/1.5Gb	6 PCI	Yes	£8,518
Genesis MP800+	4xPPC 604e	200MHz	0Mb/1.5Gb	6 PCI	Yes	£9,986
Motorola Mac-compatibles						
StarMax 3000/160	PPC 603e	160MHz	16Mb, 32Mb/160Mb	3 PCI, 5 PCI	Yes	£1,527, £1,879
StarMax 3000/200	PPC 603e	200MHz	16Mb, 32Mb/160Mb	3 PCI, 5 PCI	Yes	£1,938, £2,290
StarMax 4000/160	PPC 604e	160MHz	16Mb, 32Mb/160Mb	3 PCI, 5 PCI	Yes	£2,525, £2,995
StarMax 4000/200	PPC 604e	200MHz	16Mb, 32Mb/160Mb	3 PCI, 5 PCI	Yes	£2,349, £3,465
Power Computing Mac-compatibles						
Power 100	PPC 601	100MHz	8Mb/256Mb	3 NuBus	Yes	N/A
PowerCenter 120	PPC 604	120MHz	16Mb/256Mb	3 PCI	Yes	N/A
PowerCenter 132	PPC 604	132MHz	16Mb/256Mb	3 PCI	Yes	£1,761
PowerCenter 150	PPC 604	150MHz	16Mb/256Mb	3 PCI	Yes	£1,996
PowerWave 150	PPC 604	150MHz	16Mb/512Mb	6 PCI	Yes	N/A
PowerTower 166	PPC 604	166MHz	16Mb/512Mb	3 PCI	Yes	£2,697
PowerTower 180	PPC 604	180MHz	16Mb/512Mb	3 PCI	Yes	£3,049
PowerTower 200	PPC 604	200MHz	16Mb/512Mb	3 PCI	Yes	£3,284
PowerTower Pro 180	PPC 604e	180MHz	16Mb/1Gb	6 PCI	Yes	£3,754
PowerTower Pro 200	PPC 604e	200MHz	16Mb/1Gb	6 PCI	Yes	£3,989
PowerTower Pro 225	PPC 604e	225MHz	16Mb/1Gb	6 PCI	Yes	£4,459
Umax Mac-compatibles						
Apus 2000/120	PPC 603e	120MHz	16Mb/272Mb	2 PCI	Yes	£1,115
Apus 2000/166	PPC 603e	166MHz	16Mb/272Mb	2 PCI	Yes	£1,409
Apus 3000/200	PPC 603e	200MHz	16Mb/272Mb	3 PCI	Yes	£1,761
Apus 3000/240	PPC 603e	240MHz	16Mb/272Mb	3 PCI	Yes	£2,349
Pulsar 150 (was Pulsar 1500)	PPC 604	150MHz	16Mb/1Gb	6 PCI	Yes	N/A
Pulsar 166	PPC 604e	166MHz	16Mb/1Gb	6 PCI	Yes	£2,932
Pulsar 200	PPC 604e	200MHz	16Mb/1Gb	6 PCI	Yes	£3,519
Pulsar 180 MP	2xPPC 604e	180MHz	16Mb/1Gb	6 PCI	Yes	£4,694
Portables						
Macintosh Portable	68000	16MHz	2Mb/9Mb	Modem slot	No	N/A
PowerBook 100	68000	16MHz	4Mb/8Mb	Modem slot	No	N/A
PowerBook 140	68030	16MHz	4Mb/8Mb	Modem slot	No	N/A
PowerBook 170	68030	25MHz	4Mb/8Mb	Modem slot	Yes	N/A
PowerBook 145	68030	25MHz	4Mb/8Mb	Modem slot	No	N/A
PowerBook 145b	68030	25MHz	4Mb/8Mb	Modem slot	No	N/A
PowerBook 160	68030	25MHz	4Mb/14Mb	Modem slot	No	N/A
PowerBook 150	68030	33MHz	4Mb/40Mb	Modem slot	No	N/A
PowerBook 165c	68030	33MHz	4Mb/14Mb	Modem slot	No	N/A
PowerBook 180	68030	33MHz	4Mb/14Mb	Modem slot	Yes	N/A
PowerBook 180c	68030	33MHz	4Mb/14Mb	Modem slot	Yes	N/A
PowerBook 165	68030	33MHz	4Mb/14Mb	Modem slot	No	N/A
PowerBook 520	68LC040	25MHz	4Mb/36Mb	Modem slot	Upgrade	N/A
PowerBook 520c	68LC040	25MHz	4Mb/36Mb	Modem slot	Upgrade	N/A
PowerBook 540	68LC040	33MHz	4Mb/36Mb	Modem slot	No	N/A
PowerBook 540c	68LC040	33MHz	4Mb/36Mb	Modem slot	No	N/A
PowerBook 190	68LC040	33MHz	8Mb/40Mb	2 PC card	No	N/A
PowerBook 190cs	68LC040	33MHz	8Mb/40Mb	2 PC card	No	N/A
PowerBook 5300	PPC 603e	100MHz	8Mb/56Mb	2 PC card	Yes	N/A
PowerBook 5300c	PPC 603e	100MHz	8Mb/64Mb	2 PC card	Yes	N/A
PowerBook 5300ce	PPC 603e	100MHz	8Mb/64Mb	2 PC card	Yes	N/A
PowerBook 5300cs	PPC 603e	100MHz	8Mb/64Mb	2 PC card	Yes	£1,609
Duos						
PowerBook Duo 210	68030	25MHz	4Mb/32Mb	Modem slot	With Dock	N/A
PowerBook Duo 230	68030	33MHz	4Mb/32Mb	Modem slot	With Dock	N/A
PowerBook Duo 250	68030	33MHz	4Mb/32Mb	Modem slot	With Dock	N/A
PowerBook Duo 270c	68030	33MHz	4Mb/32Mb	Modem slot	Yes	N/A
PowerBook Duo 280	68LC040	33MHz	4Mb/40Mb	Modem slot	No	N/A
PowerBook Duo 280c	68LC040	33MHz	4Mb/40Mb	Modem slot	No	N/A
PowerBook Duo 2300c	PPC 603e	100MHz	8Mb/56Mb	Modem slot	Yes	£2,433
Duo Docking Stations						
PowerBook Duo MiniDock	-	-	-	None	No	N/A
PowerBook Duo Dock	-	-	-	2 NuBus	Optional	N/A
PowerBook Duo Dock II	-	-	-	2 NuBus	Yes	N/A
PowerBook Duo Dock Plus	-	-	-	2 NuBus	No	£798



Continuing Apple's drive to create Mac "solutions" is the Performa 6400/180 Home Office. Clearly not a general family tool, it abandons the all-in-one design of the family Mac in favour of a modular tower system. The tower unit itself is a bit of a styling triumph compared to the plain boxes of the true professional Macs, and provides improved expandability. This model comes with a modem too, and the software is given a business slant by the inclusion of presentation tool *Claris Impact* and *Claris Organizer,* a plain-looking but effective personal organiser that can store contact names and addresses, to-do lists and diary entries, and link them together dynamically. The 6400's RAM can be expanded to 136Mb, a big increase on the previous Performa limit of 64Mb. This, coupled with its strong performance, makes it a highly attractive business machine.

Due out before Christmas, Apple's newest Performa is aimed at creative people without the resources of a full design studio. You'll get a high-power 603e chip, 24Mb of RAM and a huge 2.4Gb hard drive. This is for storing the detailed pictures you'll be able to make with *PhotoDeluxe* and *Kai's Power Goo Lite,* both included. And the Avid Cinema video card will enable you to make your own video productions.

Contacts

For models still officially on sale, we've listed the current estimated street prices in the UK. All prices include VAT.

Prices are changing fast at the moment, and there are plenty of bargains to be had as older models are phased out. Contact the supplier below for the range you're interested in.

This autumn is the busiest ever for Mac releases, with the Mac-compatible choice in particular really hotting up. Apple's new PowerBook 1400 range will be in the shops soon (see page 66) and portable clones are expected too.

- **Apple Computer**
  Apple: 0800 127753
- **DayStar: Computers Unlimited:**
  0181 358 5857
- **Motorola**
  Motorola: 01628 763200
- **Power Computing**
  MCM: 0171 724 4104
- **Umax**
  IMC Computer: 01344 871344

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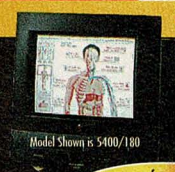
Performa 5400 – Family Macintosh



Model Shown is 5400/180

- 160 or 180Mhz PPC 603e processor
- Built in 15in AV monitor (832x624)
- Internal 28.8k modem & 8xCDRom
- Includes mouse & keyboard
- Apple TV (180 Mhz model)
- FREE software, including Claris Works, Apple Internet Kit, Grolier Encyclopedia, and Disney CD Collection

Model	16Mb	24Mb	32Mb	48Mb
5400/160Mhz 1.6GbHD	£1,389	£1,428	£1,453	£1,535
5400/160Mhz 3.6Gb HD	£1,677	£1,716	£1,741	£1,823
5400/180Mhz 1.6GbHD	£1,642	£1,682	£1,707	£1,789
5400/180Mhz 3.6Gb HD	£1,930	£1,969	£1,994	£2,076

from **£1389** **£53** per month*
£1632.08 incl VAT

Performa 6400 – Home Office

- 180 or 200Mhz PPC 603e processor
- Supports monitors up to 1024x768
- Internal 28.8k modem & 8xCDRom
- Includes mouse & keyboard
- 2 PCI expansion slots
- FREE software, including Claris Works, Apple Internet Kit, Grolier Encyclopedia, and Disney CD Collection

Shown with optional monitor

Model	16Mb	24Mb	32Mb	48Mb
6400/180Mhz 1.6GbHD	£1,299	£1,338	£1,363	£1,445
6400/180Mhz 3.6Gb HD	£1,559	£1,598	£1,623	£1,705
6400/200Mhz 2.4GbHD	£1,578	£1,617	£1,643	£1,724
6400/200Mhz 4.4Gb HD	£1,838	£1,877	£1,903	£1,984

from **£1299** **£50** per month*
£1526.33 incl VAT

PowerMac 8200/120

Shown with optional monitor

- 120Mhz PPC 601 processor
- Up to 4Mb VRAM (1280x1024 pixels)
- Internal 8x CD Rom
- 3 PCI expansion slots
- Built-in Ethernet
- 256k Level 2 cache
- FREE software, including MS Office 4.21 and Apple Internet Kit

Model	16Mb	32Mb	48Mb	96Mb	128Mb
8200/120Mhz 1.2GbHD	£1,229	£1,293	£1,358	£1,586	£1,757
8200/120Mhz 3.2GbHD	£1,489	£1,553	£1,618	£1,845	£2,017
8200/120Mhz 5.2GbHD	£1,848	£1,912	£1,977	£2,204	£2,376

from **£1229** **£47** per month*
£1444.08 incl VAT

PowerMac 7600/132

- 132Mhz PPC 604 processor (upgradable to 250Mhz)
- Fast 64bit VRAM up to 4Mb (1280x1024)
- Fast SCSI bus (up to 10Mb/s)
- Internal 8x CD Rom
- 3 PCI expansion slots
- Built-in Ethernet
- 256k Level 2 cache
- FREE software, including MS Office 4.21 and Apple Internet Kit

Shown with optional monitor

Model	16Mb	32Mb	48Mb	96Mb	128Mb
7600/132Mhz 1.2GbHD	£1,659	£1,723	£1,787	£2,015	£2,161
7600/132Mhz 3.2GbHD	£1,918	£1,983	£2,047	£2,275	£2,421
7600/132Mhz 5.2GbHD	£2,277	£2,342	£2,406	£2,634	£2,780

from **£1659** **£64** per month*
£1949.33 incl VAT

PowerMac 8500/180

Shown with optional monitor

- 180Mhz PPC 604e processor (upgradable to 250Mhz)
- Fast 64bit VRAM up to 4Mb (1280x1024)
- Fast SCSI bus (up to 10Mb/s)
- Internal 8x CD Rom
- 3 PCI expansion slots
- Built-in Ethernet
- 256k Level 2 cache

Model	16Mb	32Mb	48Mb	96Mb	128Mb
8500/180Mhz 2GbHD	£2,299	£2,363	£2,428	£2,656	£2,802
8500/180Mhz 4GbHD	£2,559	£2,623	£2,688	£2,915	£3,061
8500/180Mhz 6GbHD	£2,918	£2,982	£3,047	£3,274	£3,420

from **£2299** **£88** per month*
£2701.33 incl VAT

PowerMac 9500/200 & 180MP

- One 200Mhz or two 180Mhz PPC 604e processors
- Fast 64bit VRAM up to 4Mb (1280x1024)
- Fast SCSI bus (up to 10Mb/s)
- Internal 8x CD Rom
- 6 PCI expansion slots
- Built-in Ethernet
- 512k Level 2 cache

Shown with optional monitor

Model	32Mb	64Mb	96Mb	128Mb	256Mb
9500/200Mhz 2GbHD	£2,699	£2,845	£2,991	£3,137	£3,721
9500/200Mhz 6GbHD	£3,318	£3,464	£3,610	£3,756	£4,340
9500/180Mhz MP 2GbHD	£3,369	£3,515	£3,661	£3,807	£4,391
9500/180Mhz MP 6GbHD	£3,988	£4,134	£4,280	£4,426	£5,010

from **£2699** **£104** per month*
£3171.33 incl VAT

UMAX Apus

- Choice of 3 Models:
- Apus 2000/120 (as shown) with 120Mhz PPC 603 processor, 850Mb IDE drive, 8 speed SCSI CD Rom, 2 PCI slots, 1Mb VRAM, keyboard & mouse, FREE Claris Works and FWB HD toolkit
- Apus 2000/166 as 120 but with 166Mhz 603e processor, 1.2Gb IDE drive & 256k cache.
- Apus 3000/200 as 166 but in mini-tower with 200Mhz 603e processor, 2Gb IDE drive 2Mb VRAM & SRS surround sound speakers.

Model Shown is Apus 2000 with optional monitor

Model	16Mb	32Mb	48Mb	64Mb	80Mb
Apus 2000/120Mhz 850MbHD	£799	£863	£928	£1,009	£1,091
Apus 2000/166Mhz 1.2GbHD	£849	£913	£978	£1,059	£1,141
Apus 3000/200Mhz 2GbHD	£1,299	£1,363	£1,428	£1,509	£1,591

from **£799** **£31** per month*
£938.83 incl VAT

UMAX Pulsar

Shown with optional monitor

- Choice of 166Mhz 604, Two x 180Mhz 604e or 200Mhz 604e PPC processors
- 2-4Mb 128bit IMS Twin Turbo graphics card
- Fast 2.1Gb SCSI hard drive
- Internal 8x CD Rom
- 6 PCI expansion slots
- Built-in Ethernet
- 512k Level 2 cache
- FREE Claris Works and FWB HD toolkit software

Model	16Mb	32Mb	48Mb	96Mb	128Mb
Pulsar 166Mhz 2.1GbHD	£2,195	£2,259	£2,324	£2,552	£2,698
Pulsar 180Mhz MP 2.1GbHD	£3,499	£3,563	£3,628	£3,856	£4,002
Pulsar 200Mhz 2.1GbHD	£2,595	£2,659	£2,724	£2,952	£3,098

from **£2195** **£84** per month*
£2579.13 incl VAT

8 Speed CD Rom

- Fast 8 Speed Drive
- Photo CD Compatible
- Free Spot CD software for extra speed

8 Speed CD Rom
only £199
£234.12 incl VAT

Verbatim Media

Great media products from the market leader. Unbeatable prices!

Verbatim CDR Disk	£5.95
Verbatim 230Mb Optical Cartridge	£8.95
Verbatim 2.6Gb Optical Cartridge	£41.99
Verbatim 90m DAT Tape	£4.99
Verbatim 120m DAT Tape	£14.95

Scanners & Input Devices

Umax S6E (600 dpi)	£239
Umax S12 (1200 dpi)	£399
Umax Mirage (1600dpi A3)	£5499
Agfa Snapscan (600dpi)	£255
Agfa Arcus II (1200dpi + tranny)	£1449
Wacom Artpad II A6	£149
Wacom Ultrapad A5	£259
Wacom Ultrapad A4	£359
Visioneer Paperport VX	£249

Printers

Apple Colour Stylewriter 2500	£269
Apple 4/600 PS laser	£579
Apple 12/640 PS laser	£1059
Apple 16/600 PS laser	£1329
HP 870cxi colour inkjet	£329
HP 4MV (600dpi A3 postscript)	£2196
HP 5si (600dpi postscript)	£2899

Networking & Comms

Ethernet Cards	from £49
Ethernet Transceivers	from £19
100BaseT Fast Ethernet Cards	from £149
16 Port 10BaseT Hub	£199
Global Village 36.6 modem	£119

Monitors

Apple MultipleScan 15in	£282
Apple MultipleScan 1705	£499
Apple MultipleScan 1710 Trinitron	£659
Apple MultipleScan II 20in Trinitron	£1249
View Sonic 15in	£259
View Sonic 17in	£449
View Sonic 20in	£819

All memory configurations on this page are based on current stock prices. Prices are rising, so BUY NOW !

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"After establishing ourselves as the primary supplier of Mac upgrades, we are now bringing our expertise to hardware. We will configure systems to your requirements adding in the memory and backup that YOU need. We won't be beaten on price, and can't be beaten on service. Call us TODAY!"

Bruce Cattell, Managing Director

32Mb Simms
only £139
£163.33 incl VAT

Memory prices are rising. Buy now while stocks last

MEMORY	4Mb	8Mb	16Mb	32Mb	64Mb
30 Pin Simms	£ 24	–	£ 125	–	–
72 Pin Simms	£ 18	£ 29	£ 69	£ 145	–
PowerMac Dimms	–	£ 39	£ 69	£ 139	£ 299
Powerbook Memory from	£ 49	£ 79	£ 179	£ 279	–

Plasmon 650Mb PD Drive

- Fast 650Mb Rewritable Optical
- Quad Speed CD ROM
- Unlimited storage capacity

The new PD Drive combines the best of a Quad speed CD ROM drive with a fast 650Mb Optical, and accepts CD-ROMs and 650Mb Optical Media inter-changeably in its loading tray.

650Mb PD Drive
only £359
£421.83 incl VAT

Model	
Plasmon 650Mb PD Drive	£ 359
Plasmon 650Mb PD Cartridge	£ 29.95

Plasmon CD Writers

- Reads at 4x speed and writes at 2x or 4x speed
- Mac & PC compatible
- Backup for less then 1p per Megabyte !

Make and distribute your own audio, video or data CDs quickly and easily straight from your Mac. Each CD will hold up to 650Mb of data and has a shelf life of over 100 years!

Model	
2 speed CD Writer	£ 389
4 speed CD Writer	£ 629
Verbatim CDR Disk	£ 5.95

SPECIAL OFFER

2 speed CD Writer
only £389
£457.08 incl VAT

Hard Drives

With seek times as low as 9.5ms and sustained data transfer rates of up to 3Mb/sec, this 540Mb Drive is ideally suited to the home user want extra storage space.

At this price these drives won't hang around, so CALL NOW!

SPECIAL OFFER

540Mb External Drive
only £133
£156.28 incl VAT

Drive	Internal	External
540Mb SCSI-2		£ 133
1Gb SCSI -2	£ 175	£ 219
2Gb SCSI-2 AV	£ 266	£ 299
4Gb SCSI-2 AV	£ 619	£ 649
9Gb SCSI-2 AV		£ 1229
1Gb Iomega Jaz Drive		£ 299
1Gb Jaz Cartridge		£ 64.99
2.6Gb Optical Drive		£ 1095
Verbatim 2.6Gb Optical Cartridge		£ 41.99

Verbatim Opti Drivers

- Removable 230Mb or 640Mb optical drive
- Fully compatible with all 3.5" 128Mb and 230Mb MO disks
- Almost as fast as your hard disk
- Exceptional performance and reliability
- 40 year media life

Model	
Verbatim 230Mb Optical Drive (incl. one Disk)	£ 299
Verbatim 640Mb Optical Drive (incl. one Disk)	£ 479
Verbatim 230Mb Optical Disk	£ 8.95
Verbatim 640Mb Optical Disk	£ 28.99

230Mb Optical Drive
only £299
£351.33 incl VAT

includes FREE disk

xyratex 540Mb MaxIT

- 10ms access time – fastest removable drive available
- Inexpensive 540Mb cartridges
- Compatible with Syquest 270 and MCD media

About the size of a paperback book, the new MaxIT 3.5 inch removable disk drive is available in Macintosh and PC versions and two colours: Navigator Blue and a limited edition Horizon Yellow.

Model	
Xyratex 540Mb MaxIT Drive	£ 279
Xyratex 540Mb Cartridge	£ 39

540Mb MaxIT Drive
only £279
£327.83 incl VAT

DAT Drives

- Backup rates of up to 28Mb/min
- You nominate when & what to backup
- Reliable "set it and forget it" operation

Back up over 10Gb of data to one 120m DAT tape quickly, automatically and easily with our high performance DAT drive featuring a high performance Sony mechanism and 2 year warranty.

4-16Gb DAT Drive
only £589
£692.08 incl VAT

Model	
4-16Gb DAT Drive	£ 589
Verbatim 90m DAT Tape	£ 4.95
Verbatim 120m DAT Tape	£ 14.45

Please quote code MACF01 when ordering. All prices are for business users and exclude VAT. Next Day delivery from £9 or 48 hour delivery from £5.50. Prices and descriptions are correct at time of going to press, but may change. E&OE. All orders are subject to our terms and conditions which are available on request. We may make our mailing list available to other companies, please let us know if you would like to be excluded. *Leasing prices are based on a 36 month repayment period (APR 19.9%) and are subject to a minimum 10% deposit, status and interest rate variations. © Performance Direct 1996.

Top 10 Reasons to buy from Performance Direct

Lowest Prices
We never lose an order because of price.

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96% of our products are in stock for next day delivery. If we can't deliver for next day, we will tell you exactly when you can expect it.

Full Warranties
We only sell Proven, Quality, Fully warranted products backed by major manufacturers.

Know How
Our people are the experts in their field. You can expect friendly, helpful up front practical advice as well as after sales technical support.

Established & Financially Stable
We are going to be in business at the millennium and beyond. Our turnover is £10 million + now and growing.

Easy Payment
Unlike some of our competitors, we don't apply credit card surcharges and we never, ever charge your credit card until we ship your order. We offer 30 day terms to qualified Corporate, Educational & Public Sector organisations.

Leasing Options
We can arrange leasing for many products. Just call us for details.

Nice People
Time after time, when we ask customers why they prefer to buy from Performance Direct, they say " Because we like the people. They know their stuff; they're helpful, they're happy, they try harder".

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We put our customers first. WE CARE

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Buying Advice

When you buy goods by mail order, there are certain basic precautions you should take to protect yourself. The vast majority of transactions should go smoothly and without problems – and when problems do occur, a few simple measures can make them much easier to sort out. Many of these precautions also apply when buying from a shop.

When you take delivery...

If you're buying in person, check that everything is there and that it all works properly before you leave the shop. Make sure all the connectors fit and get the whole system up and running – Macs do not need a lot of configuring, so if all the right System software is installed (driver software to read CD-ROM drives, for example), you should be able to just plug in and boot up.

If you've ordered by mail, check the goods carefully when they arrive. Delivery companies often demand that you sign a slip saying you've received everything "in good order and condition" but it's impractical to expect them to wait while you check everything over. Inspect the packaging for obvious signs of rough handling or accident – dented corners, gashes or tears. If there are security seals (such as tape with the name of the seller on it), check that these haven't been damaged or tampered with. It's perfectly okay to add some note like "Accepted subject to inspection of contents" when you sign for the goods. If there is obvious damage to the packaging, add onto the delivery docket a detailed note describing the exact damage you can see – or insist on checking the contents before you sign.

If anything is missing, contact the supplier immediately. If anything is broken or damaged, your best option is to get the deliverer to acknowledge this in writing. Unfortunately, damage in transit is a matter between the sender and the delivery company – you're just the mug with the money in the middle – so contact the supplier immediately.

If something doesn't work, make all the obvious checks (the fuse, the plugs and the connection), but don't try to repair it. Never break any manufacturer's seal to open up a new Mac – you'll invalidate the warranty, and you won't be able to prove that any defect was there before you opened it.

If there's anything you're not happy with, don't use it – if you do, you could be deemed to have accepted it.

Other sensible precautions

■ If you are buying goods worth more than £100 in total, use a credit card if you can. Then, if anything goes wrong, you'll be legally entitled to claim against the credit card company as well as the seller. Otherwise, pay by cheque or postal order. Never send cash – it is impossible to trace if it gets lost, you can't stop payment and even if you have proof of posting it is impossible to prove how much you sent. And

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Buyer's guide to best buys

Here's how to find the best Mac hardware and software buys on the market, based on MACFORMAT's authoritative, independent product tests. If you want more information on any product, ring the contact listed or refer to our original review – if you need to order an issue you missed, turn to our back issues service on page 134.

The details listed are those of the current version of each product. All prices quoted are list prices (RRPs), *including* VAT – check the ads in this issue for the best current deals on whatever you're interested in. Where we reviewed an earlier version of a product, this is noted in the comment line. Although we quote the ratings from our original review, the comments about each item are based both on that review *and* how we see the product now.

Word 6 might be as good now as when we reviewed it in MACFORMAT 20, but the competition has come on.

Note some details may have changed since we first reviewed these products – hardware in particular is updated and improved regularly. The information here has been thoroughly checked and is correct as we go to press, but prices and specifications can change at any time. We recommend you always make enquiries before you buy, to verify the product you're considering will meet your needs.

The MACFORMAT Buyer's Guide aims to provide you with a one-stop, up-to-date directory of Mac products worth buying. You can help keep it authoritative, by passing on any corrections or updated details you know of. Write to us at the editorial address on page 7, or e-mail **macformat @futurenet.co.uk** with "Buyer's Guide" in the subject line.

Storage media

What do you do when your hard disk is full to the brim? Or when you need to transport hundreds of megabytes of data and there's no fast network link available? External storage devices can provide much-needed extra storage capacity, or a portable storehouse for vast quantities of data.

Name	Price	Rating	Reviewed	Contact	Telephone
Electronique d2 2.6Gb MO	£2,114	83%	MF43	Electronique d2	0171 833 0009
Fast and neat, but is expensive and comes with only basic software and poor documentation.					
Electronique d2 2Gb AV HD	£512	90%	MF43	Electronique d2	0171 833 0009
MACFORMAT Classic: Very stylish external hard disk with minimal documentation; basic driver software, but lightning-fast performance.					
Gasteiner 1Gb HD	£293	90%	MF34	Gasteiner	0181 345 6000
MACFORMAT Classic: Fast, cheap and compact storage medium, but with a fan that gives neighbours the impression you're testing rockets in your bedroom.					
Iomega Zip Drive	£117	81%	MF43	Iomega	0800 973194
Well-established, cheap 3.5-inch 100Mb drive that feels a bit creaky and is looking rather slow in this day and age. It might still end up replacing the floppy disk as the most ubiquitous form of storage.					
MicroNet 2.6Gb MO	£1,527	88%	MF43	MicroNet	01926 470460
Steel-cased MO drive. Speed good but not outstanding, and we had problems mounting a 1.3Mb cart.					
MicroNet 2Gb HD	£586	82%	MF43	MicroNet	01926 470460
Dependable hard disk with excellent software and good but technical documentation. Not especially fast for the price.					
MicroNet Jaz Drive	£469	94%	MF43	MicroNet	01926 470460
MACFORMAT Classic: The successor to the Zip drive uses astonishing 1Gb 3.5-inch cartridges and is fast, portable and cheap. Wonderful. This is a version MicroNet has licensed from maker Iomega.					
Olympus 230Mb PowerMO	£351	91%	MF43	Mac & More	01442 878900
MACFORMAT Classic: Compact 3.5-inch magneto-optical drive that's neat, fast, cheap and comes with a long-term warranty and good software.					
Olympus 2600 PowerMO	£1,878	89%	MF43	Mac & More	01442 878900
Fast and fairly compact, but pretty expensive compared to its rivals. Comes with a three-year warranty.					
ONE Tech 2.6 Optical Drive	£1,268	95%	MF34	MacTrix	0181 566 8988
MACFORMAT Classic: Pretty fast, quiet, inexpensive and hard to fault. Oh, and the documentation is good too. If only they could do something about the styling. We reviewed the ONE Tech 1.3Gb MO.					

Name	Price	Rating	Reviewed	Contact	Telephone
Performance Direct 2Gb	£375	92%	MF43	Performance Direct	01784 477477

MACFORMAT Classic Inexpensive and functional-looking hard disk which comes with excellent driver software and performs extremely well.

Quantum Fireball 1.2Gb HD	£269	88%	MF34	Performance Direct	01784 477477

Very quiet, very fast and a good-length SCSI cable. We reviewed the Quantum Fireball 1Gb HD.

SyQuest 230Mb	£270	94%	MF34	SyQuest	0131 339 2022

MACFORMAT Classic Uses 3.5-inch 135Mb cartridges and is extremely fast. The power supply is an annoying blob that sits next to the drive and the manual is tatty. We reviewed the SyQuest EZ135.

Xyratex 5000 2.6Gb	£1,409	90%	MF43	Performance Direct	01784 477477

MACFORMAT Classic Reasonable performance and good value for money from this big slab of a drive. Good documentation and generous-length SCSI cable.

Monitors

Not all monitors are the same. How sharp is your picture? Are the colours crisp and true to life? What resolutions are available? Is there any distortion? We've tested both 15-inch and 17-inch models from a number of manufacturers, and one thing they have in common is their weight. See MACFORMAT 44 for a look at the slim monitors of the future.

Name	Price	Rating	Reviewed	Contact	Telephone
AppleVision 1710	£927	92%	MF40	Apple	0800 127753

MACFORMAT Classic 17-inch monitor with easy controls, overscan (no black borders) and superb picture quality – plus colour calibration software.

Hitachi 17MVX Pro 2	£704	85%	MF40	Hitachi	0800 605 605

Good performance even at high resolutions, although setting up the screen could get fiddly and tedious.

Hitachi 17MVX V2	£551	83%	MF44	Hitachi	0181 849 2000

Good picture quality and comprehensive controls but disappointing documentation. Impressive for the price.

Iiyama Pro 17-inch	£735	89%	MF40	Iiyama	01438 745482

The DiamondTron screen provides excellent quality even at the staggering maximum resolution of 1,600 x 1,200..

Mitsubishi 15HX	£376	82%	MF40	Mitsubishi	01707 276 100

Uses Mitsubishi's own Diamondtron to get close to Trinitron quality and provide an excellent display.

Mitsubishi 17HX	£758	83%	MF40	Mitsubishi	01707 276100

Good quality except at the highest resolution, and comes with an anti-moiré function. The manual could be more helpful.

Samsung 15GLi	£406	81%	MF40	Samsung	0800 521 652

Good display for a unit with an FST tube although quality suffered as usual at the highest resolution.

Samsung 17GLsi	£822	84%	MF40	Samsung	0800 521 652

A 17-inch unit with a maximum resolution of 1,280 x 1,024 and a Trinitron tube. Excellent quality at all resolutions.

Sony 15sfII	£465	91%	MF40	Sony	0181 760 0500

MACFORMAT Classic Unusually for a 15-inch monitor, the Sony provides superb picture quality at all resolutions, thanks to its Trinitron tube, great-looking design and fuss-free setting up.

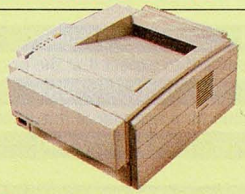
Sony 17sfII	£763	92%	MF40	Sony	0181 760 0500

MACFORMAT Classic Picture quality is excellent at all resolutions, setting up is easy and the manual is excellent – a rival to Apple's own AppleVision 1710.

Taxan Ergo Vision 730TCO	£735	84%	MF40	Taxan	01344 484646

This 17-inch monitor offers better picture quality than its 15-inch sibling. We reviewed the Taxan Ergo Vision 730LR.

Printers



Are you shopping for a mono printer or colour? Portable or desktop? PostScript or non-PostScript? Inkjet or laser? We've reviewed dozens of printers for every need, and here is our pick of the best. Don't forget to shop around for the best prices, since these change continually (usually downwards). For more on what to look for, see MACFORMAT 38.

Name	Price	Rating	Reviewed	Contact	Telephone
Apple StyleWriter 1500	£275	90%	MF38	Apple	0800 127753

MACFORMAT Classic For the price, excellent colour performance even on plain paper. Its budget background begins to show on coated and glossy papers, though.

Buying Advice continued

also, keep records – including the name of the person who took your order, the time and an order number – and obviously keep all receipts. The more documentation you have kept, the better your chances are of resolving the situation quickly.

- Shop around for the best price. Always check what is included – how about packing and delivery, any necessary cables and so on? By law, an advert must state explicitly if VAT is not included in the price; if it doesn't, VAT is included. But this can be in the small print, so check carefully.
- Whether you bought it by mail or in a shop, the law says a product must be of satisfactory quality (in other words it must work), as described and fit for the purpose for which it was sold. The Sale of Goods Act, where these stipulations come from, has recently been revised though – so you can expect some uncertainty in the short term about how the new rules are to be interpreted. In the meantime, the requirements above should serve as a good starting point. If your product should fail to meet any of them, then return it to the supplier and insist on a refund straightaway.

How to complain

If you're not happy about something, always contact the supplier first and politely explain your problem. The key here is to be patient; if there's some technical problem, it may genuinely take the dealer some time to find the solution. And, for the most part, difficulties can usually be sorted out at this stage without any further fuss – either for you or the supplier.

If yours isn't, put your complaint in writing, clearly stating your problem and what you'd like done. Give the firm a reasonable time to reply – say 14 days or so.

- If your complaint is not resolved or you feel that the dealer is not being reasonable, you may need to take some sort of legal action to enforce your rights. This need not cost you a lot of money. Seek advice from a solicitor (ask about the free advice scheme – you may not have to pay for the initial consultation). Or contact one of the following (check your local phone directory for these):
- Citizen's Advice Bureau – for general advice on your rights as a consumer, information about your options and help drafting effective letters and so on.
- Trading Standards Office (listed under your local council) – for help when you feel that an advertisement was misleading or for when you feel that a dealer is acting improperly.
- Office of Fair Trading – use this for help when you believe that a dealer is not treating you fairly.
- County Court – ask about the "small claims procedure" if you are convinced that you have explored every avenue with the dealer and are now sure you want your money back.

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Product News

All the fonts you'll ever need?

Font supplier **Monotype** is launching a new CD of fonts, called **CD 6.0**, which will have over **300 additions** to bring the total number of typefaces up to 4,000 – from such sources as The Monotype Classic Library, The Complete Adobe Library, Agfa, Linotype-Hell, ITC, Berthold, Font Bureau and Lunchbox Design. The idea is that you study the font samples, choose the ones you like and then call up **Monotype** in order to pay for them and unlock the fonts you want.

You can find out more by calling **Monotype** on **0800 371242** or by visiting the company's Web site at **http://www.monotype.com/**

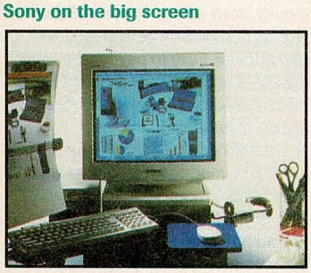
New digital camera from Sony

Sony has announced a new digital camera. The **DK-1's** maximum resolution of **768 x 576 pixels** will produce pictures which are perfectly adequate for **screen display**, **Web pages** or newsletters and other documents printed on desktop printers. For professional publications though, you may need to reduce them in size to disguise the limited resolution.

You compose your images using a "real-time" electronic viewfinder and via the **12x zoom lens** (an extremely wide zooming range). You also get a **"macro"** setting for close-ups of flowers, insects and other tiny subjects. The removable **10Mb storage card** can hold up to **140 images**, which you can also transfer to your Mac via a SCSI lead.

The DK-1 costs **£1,760**, and you can find out more from its distributor, **DirekTek**, on **01494 471100**.

Sony on the big screen



While **Sony** was launching the **DK-1 digital camera** (above), it's been busy working on its range of monitors too. The latest model to join the range is the **20-inch TrueView**, which is designed for **publishing professionals**, **illustrators** and anyone else who needs a large display area combined with **maximum sharpness** and **colour fidelity**.

The sharpness comes from Sony's own **Trinitron tube** technology (see

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Name	Price	Rating	Reviewed	Contact	Telephone
Apple StyleWriter 2500	£359	84%	MF38	Apple	0800 127753
A big improvement on its predecessor, but not quite in the same league as colour rivals from HP and Epson.					
Citizen PN60	£340	82%	MF27	Citizen	01753 584111
Minute portable printer that can output in colour. The size makes the controls fiddly, though, and performance is suspect.					
Epson EPL-5500	£469	89%	MF39	Epson	01442 61144
Compact and light 600dpi PostScript printer with a useful 5Mb of RAM. Documentation is turgid, though, and you'll need to buy a lead for your Mac.					
Epson EPL9000	£2,055	84%	MF29	Epson	01442 61144
A3 600dpi PostScript printer that provides good quality output from a surprisingly compact box.					
Epson Stylus Pro	£513	90%	MF38	Epson	01442 61144
MACFORMAT Classic Built like a breeze block, but offers stunning smoothness and resolution, even though greens turned a bit muddy. Almost as good as a dye-sub printer.					
Fargo PrimeraPro	£1,585	84%	MF38	Bannerbridge	01268 419101
Thermal wax output is harsh and grainy, but the dye-sub output has superb definition and colour that may prove good enough for match printing.					
FotoFUN! Printer	£493	87%	MF31	Bannerbridge	01268 419101
Affordable, good quality dye-sub colour output. Takes up little space but only prints out 6-inch x 4-inch snapshots.					
HP LaserJet 5MP	£1,198	95%	MF29	Hewlett Packard	0990 474747
MACFORMAT Classic 600dpi PostScript laser printer with excellent greyscale and resolution enhancement for remarkable output quality at the price.					
HP DeskJet 340	£235	85%	MF27	Hewlett Packard	0990 474747
Portable 300dpi inkjet with colour capability and excellent output quality. Clear leader amongst the portables at this price. We reviewed the HP DeskWriter 320.					
HP 870cxi	£494	92%	MF38	Hewlett Packard	0990 474747
MACFORMAT Classic First-rate colour balance, excellent contrast and very good performance on plain paper is combined with good value. It's a winner! We reviewed the HP 850C.					
Lexmark Optra R Plus	£1,434	84%	MF29	Lexmark	01628 899 088
Magnificent 1,200dpi PostScript output from a device that could crush your desk. Expect long print times. We reviewed the Lexmark Optra R.					
NEC SuperScript 3000	£1,115	88%	MF35	NEC	0345 404020
Three different printing technologies at a bargain price, but second-division quality and long print times.					
Tektronix Phaser 140	£1,351	88%	MF38	Aztec Associates	01274 590 555
Affordable PostScript colour printer. Colour and definition nearly on a par with non-PostScript models.					

Digital input

How do you get analogue data from the real world into digital data on your Mac? Here is MACFORMAT's pick of scanners, digital cameras and related software. For more details on digital imaging, see our cover feature in MACFORMAT 41.

Name	Price	Rating	Reviewed	Contact	Telephone
Epson GT-5000	£469	81%	MF41	Epson	01442 61144
This scanner's a little fuzzy but has reasonable colour reproduction. A little lacking in features, with poor documentation.					
Kodak DC-20	£353	91%	MF41	Kodak	0800 281487
MACFORMAT Classic Pretty low-resolution digital camera but extremely easy to use and fun too. Comes with some basic image editing software and other useful goodies.					
Kodak DC-50	£1,058	87%	MF41	Kodak	0800 281487
This camera's higher price pays off with crisp images and deep colours. You get a zoom lens, and you can fit storage cards up to 40Mb in size.					
Linotype-Hell Saphir	£3,819	89%	MF41	Linotype-Hell	01242 285065
Superb quality scanner with excellent colours and incredible sharpness. But then you'd be entitled to expect it at the price.					
Microtek Scanmaker E3	£328	86%	MF41	CU	0181 358 5857
At 600dpi, images were a bit fuzzy and lost subtlety, but overall performance is very acceptable for a scanner of this price.					
Umax S-12 scanner	£820	86%	MF44	IMC	01344 872 800
An impressive scanner, which does all it claims to – for the price, an excellent buy.					
Umax Vista S6E	£499	85%	MF41	IMC Distribution	01344 872 800
Very fast scanner but with a little fuzziness and difficulty with greens. Otherwise quality was good, given the price.					
Visioneer PaperPort	£293	86%	MF28	CU	0181 358 5857
Tiny A4 mono scanner that can sit between your keyboard and Macintosh – sheets are rolled in and out.					

Office

Most Macs are used at one time or another in the office or study, using worthwhile applications like word processors, databases and spreadsheets. There are many related productivity applications, too, like personal organisers and presentation packages. Here's our pick of the best.

Name	Price	Rating	Reviewed	Contact	Telephone
Act 2.5	£199	86%	MF36	Symantec	01734 814 230

Feature-heavy contacts manager that works well in sales offices, but lacks flexibility as a personal organiser.

C•A•T	£222	81%	MF32	Chang Labs Europe	01285 644403

An endlessly customisable personal office organiser that can cope with correspondence, client lists and even invoicing.

ClarisImpact 2	£152	86%	MF34	Claris	0181 756 0101

Combines spreadsheet functions with charting, outlining and DTP for the ultimate low-end business presentation suite.

ClarisWorks 4.0	£152	92%	MF31	Claris	0181 756 0101

MACFORMAT Classic The Mac's standard all-in-one office suite. Inexpensive yet very powerful in the right hands, and highly flexible too. Get it and use it.

Excel 5	£220	87%	MF18	Microsoft	0345 002000

The only professional spreadsheet package on the Mac boasts 3D documents, pivot tables and more power than a Saturn 5. Includes outlining, database functions and more.

Expresso 1.0	£20	89%	MF31	Softline	0181 401 1234

Personal organiser that makes up for in charm and value what it lacks in high-powered relational data-handling.

FileMaker Pro 3.0	£234	96%	MF37	Claris	0181 756 0101

MACFORMAT Classic An excellent database that's been tweaked and tuned, and is now fully relational. Be very sure you need more power before shopping elsewhere.

Let's KISS	£153	91%	MF41	Softline	0181 401 1234

MACFORMAT Classic As a piece of software design, so far ahead of traditional spreadsheets and feeling so right that you wonder why no-one thought of it sooner.

Organizer 1.0	£58	84%	MF31	Claris	0181 756 0101

Efficient and elegant (even slightly prim) personal organiser. Effective and affordable, though sometimes confusing.

TypeReader Professional	£464	80%	MF44	Tekware	01384 392121

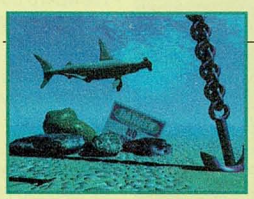
Impressively accurate and effective to use, but like any OCR software it sometimes needs rather more help then you imagine.

Up-to-Date & Contact 3.5	£116	89%	MF31	Now! Software	01525 237001

Dynamically-linked duo of contacts manager and diary. Occasionally a little too complex for its own good.

Word 6.0.1	£220	92%	MF20	Microsoft	0345 002000

MACFORMAT Classic The world's favourite word processor has a monumental feature list but a bewildering array of controls, toolbars and gadgets that make it feel simply top-heavy. We reviewed *Microsoft Word 6.0.*



Graphics

From image-manipulation to professional illustration to 3D design and raytracing, here's our pick of the top Macintosh graphics packages.

Name	Price	Rating	Reviewed	Contact	Telephone
Bryce 2	£234	93%	MF38	Principal	01706 832000

MACFORMAT Classic 3D landscape creation tool that's more versatile than its predecessor and can create indoor scenes too. Easy (by the standards of 3D software) and capable of breathtaking results.

CorelDraw 6	£465	91%	MF44	Channel MM	01703 814142

MACFORMAT Classic You need a PowerMac, you need plenty of RAM, you need hundreds of megabytes of disk space but, if you have all of these, *CorelDraw* is great.

Dabbler 2	£59	90%	MF35	CU	0181 358 5857

MACFORMAT Classic Natural media painting program for those awed by multi-layered dialogues and complex options. Backed up with lots of CD-ROM resources.

Extreme 3D 1.0	£645	86%	MF39	CU	0181 358 5857

Brilliant Bézier modelling, visible light beams and fast rendering. A steep learning curve but good documentation.

FreeHand 5.5	£529	80%	MF33	CU	0181 358 5857

A big step forward from previous versions and still superior to arch-rival *Illustrator.* Some minor gripes remain, though.

Product News continued

the Buyer's Guide feature this issue) and the colour fidelity is taken care of by continuous and automatic **colour calibration**. The **TrueView** is fully compatible with Apple's own colour matching software, **ColorSync**, to help ensure that the colours you see on the screen are the colours you will get when your work is printed. You can also adjust the monitor's **"colour temperature"** – which dictates whether the image appears "warm" (yellowish) or "cool" (blueish).

The **TrueView** is a **multiscan** monitor, and its maximum resolution is **1,600 x 1,200 pixels**, approximately six times higher than that of a standard 14-inch Mac monitor. The price for this professional power is **£3,800**, but for that you're likely to get performance you won't find anywhere else.

You can find out more by calling **DirekTek** on **01494 471100**.

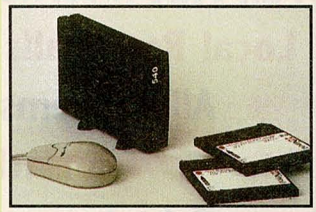
All change please

It's nice to be able to listen to a bit of Stravinsky while you're working away on your Mac, but what happens when your software wants to fetch some data from your own CD? Stravinsky has to step outside for a minute while you fiddle about with CD cases and eject buttons, and it's all a bit of a nuisance.

But all that could change if **Nakamichi Corp** has its way. The company has engaged UK distributor **Bluepoint plc** to sell its **4CD autochanger** in the UK. It's only the size of a single CD-ROM drive, yet the **MJ-4.8si** (catchy, huh?) can swap up to four CDs automatically, on demand.

It's currently a **SCSI device** designed primarily for PCs, but there's no reason why it couldn't work with a Mac once the appropriate drivers have been written. So, any third party makers reading this who fancy producing a Mac version should have a chat with **Bluepoint** on **0181 391 4488**.

Even more storage media...



As if **removable storage media** didn't already come in enough different for-

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Name	Price	Rating	Reviewed	Contact	Telephone
Illustrator 6	£376	80%	MF37	Adobe	0181 606 4000

The latest version of this vector-based professional illustration package is nearly on a par with its great rival *FreeHand.*

Infini-D 3.5	£469	85%	MF42	Gomark	0171 731 7930

3D modelling, rendering and animation package that's easy to use but produces rather crude and mechanical results.

Kai's Power Goo	£58	90%	MF41	Principal	01706 832000

MACFORMAT Classic Provides many of the image manipulation tools of professional graphics applications, but is cheaper than many *Photoshop* plug-ins! Possibly the best fun you'll have with a graphics package.

Live Picture 2.5	£934	85%	MF38	IMC	01344 871 329

A kind of super-*Photoshop* with an unusual interface but excellent compositing. Not as RAM-hungry as *Photoshop.*

Overdrive 1.0	£176	82%	MF43	IMC	01344 871344

Live Picture's little brother, with its novel image format used here for solid compositing features at a reasonable price; let down slightly by the user interface.

Painter 4	£469	91%	MF35	CU	0181 358 5857

MACFORMAT Classic Blends traditional painting tools and media with mouse pointers and Bézier curves. Too arty for some, too amateur for others, but we rate it.

PhotoDeluxe	£88	85%	MF39	Adobe	0181 606 4000

Innovative and powerful photo manipulation package at a bargain price – if you've got the hardware needed to run it.

Photoshop 3.0	£738	90%	MF22	Principal	01706 832000

MACFORMAT Classic The market-leading professional image-manipulation program. Offers an unrivalled range of tools and plug-in effects, but needs serious amounts of RAM.

Ray Dream Studio 4.0	£222	89%	MF39	Principal	01706 832000

Easy to use with brilliant modelling and Scene Wizards, but very slow. Clear documentation and a bargain price.

SmartSketch 1.0	£60	89%	MF30	CGS Computerbild	0181 679 7307

Inexpensive vector or bitmap art package that provides many professional effects. A bit of a jack of all trades, though.

StrataStudio Pro 1.75	£1,169	92%	MF34	Principal	01706 832000

MACFORMAT Classic Creates complex geometries, resulting in detailed and realistic stills and animations. It's at the forefront of 3D software technology.

xRes 2	£645	91%	MF38	CU	0181 358 5857

MACFORMAT Classic Heavyweight graphics package aimed at a market beyond *Photoshop,* but using less RAM. Wonderful interface but no compositing.

System enhancers

Whatever Apple does to the System and Finder, there will always be programmers who think they've got a better idea – either a quicker, more efficient way of doing something, or an enhancement to the Mac's interface that makes it better-looking, more user-friendly or simply a lot more fun.

Name	Price	Rating	Reviewed	Contact	Telephone
The Little Mac Toolkit	£35	89%	MF28	Addison Wesley	01279 623 623

A disc packed with useful (and not-so-useful) shareware and freeware combined with a very good manual.

OneClick	$89	91%	MF35	WestCode Software	00 1 619 487 9200

MACFORMAT Classic Create floating palettes for launching applications and opening files, and set up short-cut macros for your favourite applications. Real power.

PopupFolder 2.0	£46	87%	MF35	Softline	0181 401 1234

Hierarchical folder menus up to 16 levels deep both in the Finder and in **Find** and **Save** dialogue boxes. Paradise!

RAM Doubler 2	£71	92%	MF43	CU	0181 200 8282

MACFORMAT Classic As long as you have a modern Mac, *RAM Doubler* is such an essential utility you'll wonder how you coped without it.

Multimedia authoring

As business presentation packages start to offer the features of multimedia authoring kits, and as authoring kits are used more and more by businesses looking for presentations with more polish, the boundaries are becoming blurred – hence the umbrella title "multimedia authoring" used here. This includes animation and video too.

Name	Price	Rating	Reviewed	Contact	Telephone
Amazing Animation	£58	90%	MF26	Claris	0181 756 0101

MACFORMAT Classic Animation tool aimed at kids and which comes with a stock of characters to animate and the ability to add your own via scans. Children love it.

mats, French maker **Nomaï** has introduced another one. The **540Mb 3.5-inch drive** doesn't have the capacity of the 1Gb Iomega Jaz drive, but it's cheaper and is compatible with **3.5-inch 270Mb SyQuest cartridges**. And according to Nomaï's figures, it's every bit as fast as the Jaz drive.

The Nomaï 540 costs around £230, but this doesn't include a cartridge – these weigh in at around £46. This pitches it firmly between the Zip drive and the Jaz drive on price. If you just want more long-term storage capacity, an external hard disk will give you more megabytes per £, but if you want to be able to transport large quantities of data and your storage needs are likely to keep on growing, removable media like this make sound economic sense.

You can find out more from the UK distributor **Computers Unlimited** on **0181 358 5857**.

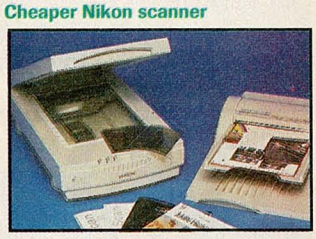
ISDN/analogue modem

More and more companies are setting up **ISDN lines** for data transfer. BT charge plenty for the privilege, but the advantage is in the speed – it's much faster and more reliable than analogue communications.

But many services you might want to connect to are still analogue-based, so modem maker **US Robotics** has come up with a solution in the form of the **Courier I-modem**. It will work on **Basic Rate ISDN lines,** giving a data transfer rate of 64Kbps per channel. It can also switch automatically to analogue mode, where it supports all current "V" standards.

The price will be around **£470**, and you can find out more from **US Robotics** on **01734 228200**.

Cheaper Nikon scanner



Nikon's ScanTouch 110 flatbed scanner has been reduced in price by around £100 to £470, although the company expects you will be able to buy it for as little as **£300** in the high street. Good news if you were about to buy one, but extremely bad news if you've just done so.

The 110 is a **single-pass** scanner with an optical resolution of **300 x 600dpi**. This is the resolution of the raw data, although **software "inter-**

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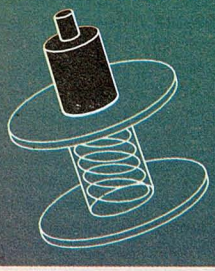

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Name	Price	Rating	Reviewed	Contact	Telephone
Animation Works	£153	85%	MF26	Gold Disk	01734 814230

Aimed more at youngsters than professionals, but still needs drawing skills and an understanding of cel animation.

Astound	£222	91%	MF36	Gold Disk	01734 814230

MACFORMAT Classic A top presentation tool which makes handling quite complex actions easy. Surprisingly competent at general multimedia authoring.

Authorware Academic	£150	95%	MF43	Prentice Hall	01442 257115

MACFORMAT Classic Icon-based multimedia creation at its finest, this power-packed program is ideally suited to lecturers as well as students. Just as well, as they're the only people who can buy it.

Digital Chisel HTML 2.1	$159	89%	MF36	Pierian Spring	00 1 800 472 8578

Powerful entry-level educational package with a simple interface, but no built-in script language or multimedia resources. We reviewed *Digital Chisel 2.0.*

Director 5.0	£1,174	85%	MF41	CU	0181 358 5857

A sound upgrade to the industry leader for media authoring, which irons out many shortcomings. It's easier to use, too.

Director Academic	£46	95%	MF43	Prentice Hall	01442 257115

MACFORMAT Classic De-facto standard for multimedia creation in a cut-down version – for education only. Powerful and versatile but complex, especially with its Lingo scripting language.

Elastic Reality 1.21	£293	90%	MF26	Softline	0181 401 1234

MACFORMAT Classic Heavyweight morphing application that's more sophisticated than its cheaper rival *Morph,* and correspondingly harder to get into.

HyperStudio 3.0	£121	88%	MF36	TAG Developments	01474 357350

Practical and powerful tool aimed more at education than multimedia authors per se. More text styling tools are needed.

Morph 2.5	£117	84%	MF26	Softline	0181 401 1234

Powerful and enjoyable morphing program at an affordable price. Easy to use, although lacking in professional features.

PROmotion	£149	80%	MF26	Gomark	0171 731 7930

Animation program for serious or professional users, which requires skill and know-how. Can output to videotape.

Scenery Animator	$175	81%	MF26	Natural Graphics	00 1 916 624 1436

Rival landscape creator to *Vista Pro* which is just about as powerful, but includes the ability to create animated fly-bys.

Desktop publishing

Professional print publishing is still dominated by *QuarkXPress* and *PageMaker,* but this category also includes Web page design, electronic publishing in general, and various publishing utilities.

Name	Price	Rating	Reviewed	Contact	Telephone
BeyondPress 2.0	£570	85%	MF40	XChange	0171 637 2966

Easy to use *XPress* XTension for converting *XPress* pages into HTML. No support for font tags or frames, though.

PageMaker 6	£605	91%	MF32	Adobe	0181 606 4000

MACFORMAT Classic It can do everything that *QuarkXPress* can do at about half the price. Text-handling is a bit creaky, but layout and design is clean and simple.

PageMill	£88	90%	MF35	Adobe	0181 606 4000

MACFORMAT Classic At last you can forget about HTML codes and concentrate on designing Web pages. Some tags are missing and purists will moan about some eccentric codes, but you do get ease-of-use and an image editor.

QuarkXPress 3.32	£1,169	88%	MF25	CU	0181 358 5857

The market-leading professional DTP package marches on relentlessly with its excellent text-handling and XTensions. We reviewed *QuarkXPress 3.31.*

UniQorn 1.01	£1,052	80%	MF40	Principal	01706 832000

QuickDraw GX DTP application that does things *XPress* and *PageMaker* can only dream of. Needs hardware power.

Multimedia CD-ROMs

The invention of the CD-ROM has created a whole multimedia publishing industry turning out educational, reference and leisure titles by the score. Here's our list of CD-ROMs that every home should have on its bookshelf. Possibly.

Name	Price	Rating	Reviewed	Contact	Telephone
Cinemania 96	£30	89%	MF36	Microsoft	0345 002000

Typically thorough and well-designed Microsoft encyclopaedia – but would you want to buy the new version every year?

polation" (educated guessing) can increase this to an apparent **4,800 x 4,800dpi**. The ScanTouch takes flat artwork up to **A4** in size, and you can buy a **transparency adaptor** and a **50-sheet document feeder** if you want (and if you have around £420 and £500 to spare respectively).

You can find out more about this by calling the **Nikon Literature Hotline** on **0800 230220**.

More speakers

It seems only yesterday that we were all perfectly happy with our **Mac's internal speaker**. Then came the multimedia boom, and we all had to have **external speakers** (as if we didn't already have enough on our desks). Now, ordinary external speakers aren't good enough – which is true, actually, since Macs can play audio CDs rather well. Hence the new **ZY-FI Bass** from speaker maker **Zydec**.

The biggest problem with external computer speakers is **lack of bass**. Those twittery little plastic boxes most of us have can reproduce mid-tones and treble well enough, but thumping bass frequencies tend to be converted into pitiful murmurs.

The **ZY-FI Bass** system gets round this with a wooden **"subwoofer"** unit which sits on the floor under your desk and is designed to get your floorboards rattling while the other two **"satellite"** speakers do the business with the mid and upper frequencies.

If you want to find out more about the ZY-FI bass, subwoofer housings and bass reflex porting, call **Zydec** on **01386 769400**.

Java avalanche

How can a single programming language generate so much excitement? A single publisher – **International Thompson Publishing** – has announced no fewer than 17 new **Java books**, covering Borland's forthcoming Latté "programming environment" and Symantec's Café, amongst others. Titles include "The JavaScript CD Cookbook", "Java in a Nutshell" and even "KickAss Java Programming". We look forward to Java: the Movie. You can find out more about ITP's range of **Java books** by calling **0171 497 1422** or by taking a trip to the Web site at **http://www.itcpmedia.com/**

How fast?

Just when we were all congratulating ourselves on the wisdom of buying quad-speed CD-ROM drives, and pretending not to notice that six-speed and eight-speed drives are now coming out, **Tekdata** has gone one stage futher and announced a **12-speed SCSI CD-ROM drive**.

The **Plextor PX-12CSi** boasts a sustained data transfer rate of **1.8Mb per second**, combined with a random access time of 110msec. It also comes with **PowerPlex software** which reputedly reduces the load on your Mac's CPU and ensures smoother video playback. Both **internal** and **external** versions of the **CD-ROM**

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Product News continued

drive are available, and they cost **£350** and **£410** respectively.

To find out more, call **Tekdata** on **01782 577677** or visit the Web site at **http://www.tekdata.co.uk/**

Peripherals for special needs

Don Johnston Special Needs Ltd supplies a range of keyboard alternatives for kids who might have trouble with a standard keyboard and mouse. These include **Discover:Board,** which is a souped-up talking keyboard, **Discover:Screen,** a talking on-screen keyboard, and **Discover:Switch,** which is designed specifically for those with physical disabilities.

Take a look at the full Don Johnston range at the company's Web site at **http://www.donjohnston.com/** or call **01925 241642.** For more information on special needs and the Mac, take a look at our "Enabling the future" series in MACFORMATS 41, 41 and 42

Dig into the ToyBox

Sherston Software has launched a new range of activity-based programs for four to six year-olds. Available on both floppy disc (mainly for schools which don't yet have CD-ROM drives) and CD-ROM, they will not only help teach the **alphabet,** but also **rhyming, matching** and **sorting, colours** and other important early topics.

The CD-ROM version will have extra activities, enhanced animations, music and "pure speech" but, according to **Sherston,** people who buy the floppy versions "will not be disappointed".

The ***ToyBox*** will cost around **£40** and should be available from January 1997 onwards. You can call **Sherston** on **01666 840433** or visit the Web site at **http://www.sherston.com/**

PR Quote of the Month

"...a visionary adaptive workflow management strategy for digital printing and publishing that relies on intelligent agents and advanced adaptive software technology." Excuse me?

Mac Diary

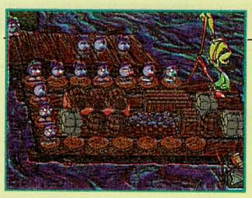
Online Information 96

Where: Olympia 2, London
When: Tuesday 3 December to Thursday 5 December
What: Combined conference and exhibition based on "electronically-available media", including multimedia and the Internet.
Contact: Call 01923 233442
Price: Free

UK Internet Show

Where: Olympia, London
When: Wednesday 15 January to Friday 17 January
What: Business-orientated exhibition and conference about the Internet, intranets and other commercial possibilities.
Contact: Sally Buller on 0171 208 4162
Price: £10 at the door, free on pre-registration.

Name	Price	Rating	Reviewed	Contact	Telephone
Encarta 96	£50	83%	MF42	Microsoft	01345 002000
Microsoft's definitive multimedia encyclopedia is bang up-to-date, but the Mac implementation is flawed.					
Encyclopedia of Nature	£40	85%	MF36	Dorling Kindersley	0171 753 3488
Excellent enhancement of the paper-based encyclopaedia, but not enough interactive multimedia technology.					
Encyclopedia of Science	£40	89%	MF32	Dorling Kindersley	0171 753 3488
Misses out on cutting-edge whizz-bang multimedia, but provides an absorbing background to science in general.					
History of the World	£40	89%	MF38	Dorling Kindersley	0171 753 3488
More flashy and inspirational than in-depth and authoritative. Oozes quality, but built for browsing rather than research.					
Makers of the 20th Century	£45	89%	MF41	News Multimedia	01525 852 813
200 personalities of the 20th Century are examined and explained in a well-presented and often intriguing CD.					
MTV Unplugged	£25	88%	MF40	CIC	0181 846 9433
Multimedia database of *Unplugged* performances going back seven years and including interviews, video and set listings.					
Music Central 96	£40	95%	MF40	Microsoft	0345 002000
MACFORMAT Classic *Music Central* is to music what *Encarta* is to the world at large. Typically for Microsoft, very good indeed, with a subscription deal for regular Web updates.					
Quest for Fame	£50	85%	MF40	IBM	01329 242728
Cross between a game and a multimedia celebration of the pop industry. Embark on your own quest for fame.					
RedShift 2	£50	92%	MF32	Maris Multimedia	0171 488 1566
MACFORMAT Classic Restrained but magnificent exploration of the universe using sound astronomic principles, hailing originally from Russia rather than the gung-ho States. Utterly definitive.					
Wings: Midway to Hiroshima	£40	86%	MF33	BMG	0171 384 7800
A database of 636 aircraft from World War II, together with 15 virtual planes and five virtual airbases to explore.					
World Reference Atlas	£50	90%	MF37	Dorling Kindersley	0171 753 3488
MACFORMAT Classic Bestrides the Earth like a colossus, giving you the information you need, when you need it. The maps and graphics are mouth-watering.					



Multimedia for kids

How do you keep the kids entertained on a wet Sunday afternoon in November? How do you justify the purchase of a new PowerMac to your spouse/bank manager/conscience? Multimedia CD-ROMs for kids can entertain, occupy and educate all at the same time. Here are the best we've seen.

Name	Price	Rating	Reviewed	Contact	Telephone
Adventures of Peter Rabbit	£30	88%	MF43	Mindscape	01444 246333
Seven-year-olds might find this a tad naïve, but the charming atmosphere and beautiful illustrations make it a real winner.					
Counterfeit Collaborator	£28	90%	MF35	Sierra	01734 303322
MACFORMAT Classic A genuinely intriguing mystery forms the heart of this Playtoon CD. French imagination and illustration translated into English make a beguiling combination.					
Darby the Dragon	£20	89%	MF44	Brøderbund	01429 273029
A rare and challenging adventure game, which will educate and captivate your kids.					
Digby's Adventures	£20	87%	MF35	Eidos Interactive	0121 606 1800
A lovable Yorkshire terrier gets into all sorts of scrapes in this entertaining shaggy dog's tale.					
Fun School Young Scientist	£26	85%	MF42	Europress	01625 859 444
Fun educational package for five to nine-year-olds, with lots of suggestions for out-of-school activities.					
Gregory and the Hot Air Balloon	£20	85%	MF44	Brøderbund	01429 273029
Aimed at the younger adventurer, this is a well designed interactive story, if perhaps a bit too "cute" for older kids.					
Greatest Toyshop on Earth	£30	88%	MF32	Omnimedia	0181 974 6766
A brilliantly entertaining set of kids' toys in a comforting and thoroughly British environment, *The Greatest Toyshop on Earth* is somewhere to keep coming back to.					
It's a Bird's Life	£20	87%	MF35	Eidos Interactive	0121 606 1800
With 60 pages of story, *It's a Bird's Life* entertains your kids and teaches them something at the same time.					
KidWorks Deluxe	£35	88%	MF43	ABLAC	01626 332233
An excellent package which encourages children to get involved in all aspects of story-making.					
Logical Journey of the Zoombinis	£30	96%	MF41	Brøderbund	01429 273029
MACFORMAT Classic A well-designed course in mathematical logic for kids that's almost completely disguised as a superb-looking and fun game.					
The Lost Mind of Dr Brain	£28	92%	MF43	Sierra	01734 303322
MACFORMAT Classic Challenging, lots of fun and well suited to the intended age group, *Dr Brain* is addictive and has longevity. A great buy.					
The Mandarine Prince	£28	88%	MF37	Sierra	01734 303322
A firm favourite in his native France, cub reporter Spirou solves another mystery in this fine title.					

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Page 3 BBS

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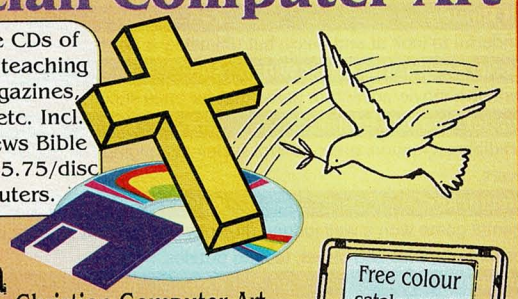

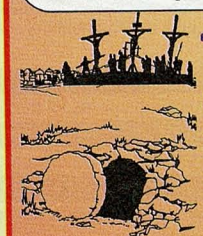

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User groups

If you're new to the Mac, exploring an unfamiliar application, or just having problems with any aspect of your machine, there's no substitute for hands-on, face-to-face assistance. Apple's telephone Assistance Centre (01753 615999) can help with hardware or System problems, and a software supplier's technical support line can be invaluable, but there's no doubt the best guide is someone who's been there, knows what you're facing and can lead you through it. But if you don't have a Mac-owning friend nearby, how do you find such a person?

For many people, the ideal answer is a user group – a more or less informal club of people interested in the same subject. Some groups are large and quite structured; others are not much more than informal, sporadic get-togethers of kindred spirits. Some ask you for a membership fee; for others, the price of admission might be no more than standing your round at the bar. Particularly in the case of special interest groups or those dedicated to particular software applications, they can be some of the best sources of information, advice, and help.

Bear in mind that many groups are run by enthusiasts as a hobby in their spare time, so you can't always expect to be able to call for instant help. Some groups simply meet every now and then in a local pub to swap experiences; others even publish regular newsletters containing news, bug reports and helpful advice.

Over the next few pages, we've included lists of UK user groups, together with contact names and telephone numbers. We want to make this a regular feature of this section, so if you want to publicise your own user group, send us a letter explaining what it's about, where you meet and whom interested readers should contact.

This is a free service for amateur, non-profit-making Mac user groups. MACFORMAT does not endorse or recommend any group and cannot be held responsible for any problems you might suffer as a result of contacting any of the groups listed here.

UK User Group Council list

The UK User Group Council maintains a list of Mac user groups that register with them. If you wish to contact the council, call John McKnight on 0181 314 5555.

Local groups

- **Aston University Mac UG**: Birmingham area. Contact Ray Tier on 0121 359 3611
- **Berkshire Mac UG**: contact Ian Burn on 01734 813
- **Blackburn Mac UG**: contact Roger Moreton on 01254 670043
- **Bristol (BAUD)**: contact Malcolm Ingsley on 01454 616846

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Name	Price	Rating	Reviewed	Contact	Telephone
Marty & the Trouble with Cheese	£25	81%	MF37	Maxis	0171 505 1500
Not the best story in the world, but cute characters and microphone (rather than keyboard) input make this storybook fun.					
Maths Workshop	£30	90%	MF41	Brøderbund	01429 273029
MACFORMAT Classic Teaches maths in the broadest possible sense, with wonderful-looking activities and a good manual. Needs adult assistance, though.					
My First Amazing World Explorer	£30	89%	MF41	Dorling Kindersley	0171 753 3488
Interactive atlas that's pitched at just the right level for younger children, showing the world as a diverse and living thing.					
PB Bear's Birthday Party	£30	92%	MF35	Dorling Kindersley	0171 753 3488
MACFORMAT Classic Interactive storybook entertainment for three-year-olds which combines fun, learning and real photography in a quality package.					
Peter Rabbit's Numbers	£30	82%	MF41	Mindscape	01444 246333
Not that much to do and a bit repetitive, but a good learning tool nonetheless, and quite rewarding for children.					
The Secret of the Castle	£28	90%	MF35	Sierra	01734 303322
MACFORMAT Classic This Playtoon disc is produced to the same high standards as its sister titles, but in this case its value is more entertaining than educational.					
Sitting on the Farm	£20	87%	MF35	Eidos Interactive	0121 606 1800
Make up your own stories and songs with this farmyard-based disc.					
The Stone of Wakan	£28	88%	MF37	Sierra	01734 303322
This Playtoon animated storybook offers one of the most sophisticated tales in the range.					
Uncle Archibald	£28	90%	MF35	Sierra	01734 303322
MACFORMAT Classic Another excellent Playtoon about imaginary monsters that come to life. Slapstick chaos is the result. And you can use it to learn French.					
Word Stuff	£20	85%	MF39	Centregold	0121 606 1800
Teaches English and explains various everyday situations. An excellent blend of entertainment and real educational value.					

Games

Discover the Top Ten Mac games of 1996 in MACGAMER

As a games machine, the Mac now rivals both the PC and the plethora of whizz-bang plastic games consoles flooding the market. The best games tend to be those that involve brains as well as reflexes, and those which absorb you thoroughly into their game-world.

Name	Price	Rating	Reviewed	Contact	Telephone
Allied General	£45	85%	MF37	Mindscape	01444 246333
Standard but utterly absorbing hex-based wargame spiced with black-and-white newsreel footage.					
Angel Devoid	£40	84%	MF37	Mindscape	01444 246333
Compelling and violent game that's also an interactive movie. Traditional adventure format with an unsettling atmosphere.					
Colonization	£45	93%	MF32	MicroProse	01454 893900
MACFORMAT Classic The follow-up to *Civilization* is hardly an orgy of state-of-the art sound and graphics, but it is an utterly absorbing simulator with long-term appeal.					
The Dig	£45	83%	MF38	Virgin Int. Ent.	0171 368 2266
Wonderful production and mind-bending puzzles wrapped up in a glitzy package that doesn't quite bowl you over.					
Doom 2: Hell on Earth	£45	90%	MF31	Virgin Int. Ent.	0171 368 2266
MACFORMAT Classic The blood-spattered violence *Doom* is famous for hides some quite involving puzzle-solving. One of the best 3D arcade games around.					
Full Throttle	£45	85%	MF37	Virgin Int. Ent.	0171 368 2255
Wonderful to look at and enjoy, but ultimately a portfolio of entertaining cut scenes punctuated by mainly shallow puzzles.					
Gabriel Knight: The Beast Within	£45	84%	MF42	Sierra	01734 303322
Interactive movie/adventure game that for once successfully blends video footage with excellent gameplay.					
Muppet Treasure Island	£35	80%	MF44	Activision	0181 742 9400
Incredible animation, great control system, engaging sub-games and puzzles, but not enough longevity even for younger players.					
Safecracker	£40	82%	MF44	Warner Interactive	0171 391 4300
A gentle game with a well judged difficulty curve. What it might lack in raw excitement it amply makes up for with its excellent graphics and clever, testing puzzles.					
SimIsle	£35	83%	MF43	Maxis	0171 505 1500
A good idea with clean and pretty graphics, but having to work through agents all the time can be frustrating.					
Spycraft	£50	84%	MF39	Activision	0181 742 9400
An involving spy simulator that needs time and hardware. Superb blend of video, arcade sequences and puzzles.					
Ultimate Doom	£30	85%	MF34	GT Interactive	0171 258 3791
This full version of *Doom 1* is shaded little by the release of *Doom 2* and is a good buy for budget-conscious blood fans.					

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- **Cumbria Mac user group.** Monthly meetings, newsletter, training (reasonable rates). Call Linda Linsell, 01229 828422 or send SAE c/o 10 Athol Street, Barrow-in-Furness, Cumbria LA14 2QT.
- **Gateway UG**: Norfolk area. Contact Verne Anderson on 01638 513000
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- **Performa 450 4/120,** colour monitor, mouse, keyboard, manuals, disks, Stylewriter II, excellent condition, hardly used, boxed. North London, Helen ☎ 0171 972 6700 ext 2332 (day)
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- **Apple 14-inch Trinitron monitor,** boxed, little used, will sell or swap for quad-speed CD-ROM drive. Milton Keynes area, Matt ☎ 01908 565274
- **PowerMac 7500/100 32/500,** quad-speed CD drive, System 7.5, 15-inch colour multiscan monitor, keyboard, mouse, boxed, manuals, *RAM Doubler* installed – £1,800. Karen ☎ 0181 579 9306 (eves)
- **Mac LCII 4/40,** keyboard, mouse, some software – £200. Cambridge ☎ 01223 358762
- **PowerBook 170** with power adaptor – £375; PowerBook duo 230 with power adaptor and case £350; PowerBook fax/modem – £20. ☎ 01480 300409
- **PowerMac 7200/ 75 24/500,** quad-speed CD-ROM drive, HP660C printer, mouse, keyboard, under 12 months old, no monitor, some software – £1,300 ono. Leroy ☎ 01952 276173
- **Calcomp 660PS** colour PostScript printer – £1,800; JVC External CD Writer – £600; D2 Ergo 270Mb Syquest, plus two cartridges – £250; 6100 IBM card – £90. Lincs ☎ 01507 601803
- **8Mb 72-Pin SIMM** as new – £30 ono. Mark ☎ 01437 765391 (day), 01437 763994 (eves)
- **Performa 475 4/160,** Performa colour monitor, Deskwriter 520 printer, loads of pre-loaded software, includes disks, manuals, magazines, coverdisks, boxed – £800 ono. Devon ☎ 01392 875200
- **Performa 630 8/500/CD**, 15-inch colour monitor, DeskWriter 520 printer, manual, software, Flightstick Pro joystick – £795 ono. Watford ☎ 01923 674427
- **Messagepad 120,** 2Mb with modem, print pack, leather case, software – £225. Worcester ☎ 01905 610495
- **PowerBook 140 4/40,** doubled to 8/80, System 7.01 – £350 ono; Apple II b/w scanner – £125. E. Sussex, Richard ☎ 01323 898339 (eves)
- **Performa 6200,** 40/500, CDTV, colour StyleWriter 2400, Stylus XL Pro (A3 colour) – offers. Paul ☎ 01785 816922 or 01785 814426
- **Newton 120,** as new, boxed, charger, re-chargeable NI-CAD, manuals – £375 ono; SyQuest 270Mb external, five cartridges, extremely compact – £320 ono. ☎ 0117 983 6080 (day)
- **Optical disks,** unused, Verbatim 230Mb, re-writeable, box of five – £45 or £9.50 each. ☎ 0116 270 1413
- **PowerMac 6100 8/350,** 60MHz, 14-inch colour monitor, printer, lots more, very good condition – £1,300. George ☎ 0171 224 0234 (day) or 0171 275 7476 (after 7.30pm)
- **4Mb 72-Pin SIMM –** £35 ono. Glasgow ☎ 0141 569 7084 or e-mail: **m1cableol.co.uk**
- **PowerMac 7200/90 56/500**, Zip drive, QuickCam, 28.8bps USR modem, design speakers, extended keyboard, 15-inch multiscan monitor, Internet software – £2,200. Ben, Leeds ☎ 0113 2441334 (day) 01423 541472 (eves)
- **Mac IICX 8/80,** System 7.1, 14-inch high-res colour monitor, extended keyboard, Apple CD 600e quad-speed, LaserWriter NT, Calcomp drawing board II (12x12), extras, excellent condition – £850 ono. Edinburgh ☎ 0131 554 8419
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- **Quadra 660AV 16/250 CD,** Geoport modem, keyboard, mouse, 14-inch AV stereo monitor, software – £950; Newton 120/2.00s, *Newton Press* – £290. Arnim ☎ 01484 866091
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- **Performa 6200/75, 16/800CD,** 14-inch multiscan monitor, colour StyleWriter Pro printer, keyboard, mouse, very good condition, boxed as new – £1,575. ☎ 0115 985 5151
- **Apple LaserWriter 4/600PS,** four months old, manuals, software – £550 ono. Rob ☎ 0113 226 4107 or e-mail: **rfchilvers@worldscope.co.uk**
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- **Apple 8.24 Nubus video card** . Carmelo ☎ 0181 540 1052 or e-mail: **cmanganaro@cygnet.co.uk**
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- **PowerBook 190/66 4/500,** StyleWriter II printer, complete with manuals and boxes – only £850. Nick ☎ 01635 44600 (eves)
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- **Mac SE 4/20 (40),** keyboard, mouse – £200. ☎ 01582 570167 (eves)
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- **LCII 10/80,** 14-inch colour monitor, mouse, keyboard, FPU, manuals, System 7.1 – £300. Derek ☎ 01902 887017
- **LCIII 8/80,** 14-inch Trinitron monitor, CD300e CD-ROM, Star MC144 colour printer, lots of software – £500 ono. Glasgow, Ian ☎ 0141 578 3074
- **d2 Syquest 270Mb drive,** cable, four 270Mb cartridges, light home use, bought January 1996, excellent condition, cost £600 – accept £400. ☎ 01427 616989.
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■ **Scanmaker E3** 24-bit colour scanner, OCR software, image editing software and *ScanWizard* , only used once., fully boxed, manual, in mint condition – £250. ☎ 0181 903 3479.

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Software for sale

■ ***Diskworld* CD-ROM –** unregistered, *Diskworld Official Strategy* guide book – cost £68 for both – will sell for £45. Staffs, Mary ☎ 01782 819825.

■ **Oxford English Dictionary** on CD-ROM – £220; *MacWrite Pro* – £35; *Painter 2.0/X2* – £35; *Soft PC* – £35; *QuicKeys 3.0* – £30; *MacSchedule 3.0* – £35; *Textbridge 3.0* – £45 (unreg). ☎ 01895 272680 NW or 0385 975457

■ **Games –** *DarkForces, Diskworld* – £20 each, may consider swaps; 4Mb 72-pin SIMM – £20. Herts, Alex ☎ 01920 823860

■ DKs *My First Amazing World Explorer* CD-ROM – £15, incl. postage. Anne ☎ 0181 224 6975

■ ***Phantasmagoria,*** *Alone in the Dark II* – £25 each; *Leisure Suit Larry 6, Populous II, Theme Park, Syndicate, PowerMonger, The Animals, PGA Golf II* – £15 each CD. ☎ 0181 968 8680

■ **Macintosh CD-ROMs**, *Shakespeare Collection* – 3 CD-ROM set, boxed, unopened – £30; *Forrest Gump* – 3 CD-ROM set, *Music Anthology* Mac or PC – £20; *QuickToons Cartoons* CD-ROM – £10. ☎ 01480 300409

■ **KPT *Bryce 2*** CD-ROM, manual – £75; 4 x 8Mb 72-pin SIMMS – £125. Peter ☎ 01424 429686 (after 6pm)

■ ***Buried in Time –*** £20; *Chuck Yeager's Air Combat, Power Poker* – £10 each; *Microsoft Art Gallery* – £20. ☎ 0181 968 8680

■ ***Now Up-To-Date + Contact 3.5 –*** £20; *Myst* – £15; *Deadelus Encounter* – £15; *Cinemania 96* – £15; *RAM Doubler 1.6* + Updater – £20. ☎ 0121 603 1205

■ ***The Dig –*** £20; *Marathon* – £15; *Myst* – £10; *Daedelus Encounter* – £10; *Grolier* – £10; *3D Atlas, Asterix, Rednex, Peanuts, Concertware, Making Music, Way Things Work* – £20. ☎ 0171 482 5948

■ ***Aldus Freehand –*** £35; *RAM Doubler* – £20; *Kai's PowerTools* – £20; *After Dark* – £10; *UnderWare* – £10; *BattleChess* – £10; *Creative Writer* – £10; *Fine Artist* – £10; *KidPix* – £10. ☎ 01670 354292

■ ***Ashlar Vellum v2* with Update v2.5**, professional 2D-3D CAD for architects – £800. Jerome ☎ 00323 2319750 (office) or 00 323 2332262 (home) or 00 323 2273483 (fax) (Belgium)

■ ***Think C 6.0*, disks and manuals**, *Think Reference 2.0*, six books on Mac Programming for C, lots of C Code samples – £175 ono. Larry ☎ 0121 444 4983

■ **Performa software package** incl. *Myst, Daedelus Encounter, TWTW, Aladdin Activity, Toy Story, Grolier, Encyclopaedia,* un-used, un-registered, manuals – £100 ovno. Yorks, David ☎ 01535 646596

■ **Music software**, *Jump* software incl. *Concertware* CD, 182 page manual – £20; *Morton Subotnick, Making Music,* CD Mac/Win, suit 6-12 years – £10; *Fun Music Maker*, suit 9-90 years – £15. Gerry ☎ 01232 763858

■ ***Microsoft Excel 5,*** spreadsheet for Mac and PowerMac, un-registered, un-used. complete – £200 delivered. Derek ☎ 01264 361275 (eves)

■ ***Microsoft Word 5.1*** – £12; *FileMaker Pro 2.1* – £15; *Word Perfect 2.1* for Mac – £10. All original disks. ☎ 0181 7692760.

■ ***Mac Theme Park*** – £5. ☎ 01342 715434.

Wanted

■ ***AutoCad* for Mac** and *CadMover* – can you help? Urgent. Surrey, Paul ☎ 0181 662 0826 or e-mail **lr569@greenwich.ac.uk**

■ **LaserWriter printer IINT** or IIF or IIG and Apple 21-inch monitor. Chris ☎ 01684 562564 (day) or 01905 29601 (eves)

■ ***Accel Scan Mediator*** desk accessory. ☎ 0171 375 3151 or e-mail **106120.143@compuserve.com**

■ **Urgently – for primary school –** six CPUs, four monitors, four keyboards, four mice, eight CD drives, four printers, one QuickTake camera; LCIII, 475 or 630 Centris, 610 or 650, Quadra. Lionel ☎ 0181 692 4907 or home 0181 469 0823

■ **Nubus video card for IIcx,** capable of 256 colours on 14-inch monitor; also wanted keyboard and mouse. Leeds, Richard ☎ 0113 242 7602 (eves except Friday)

■ **Kensington Thinking Mouse** with software and manuals. Leicestershire, Ben ☎ 01530 271799

Swap shop

■ ***Doom II,*** will swap for *Dark Forces, Warlords II* or *F/A18 Hornet 2.0* + *Korean missions.* E-mail – **alexidis@olymp.ccf.xuth.ge** or fax – 00 30 (0) 31 997622 Greece

Books and magazines

■ **MACFORMAT 1-32 with floppies,** 1996 issues with CDs – £45, you collect. London, Barry ☎ 0181 888 6503

■ **Books:** 3D, C, VR, Director, C++, KPT, MACFORMAT back issues. ☎ 00 33 9555715210 (France)

■ **MACFORMAT CDs** numbers one (June 94) to 34 (Feb 96) complete collection – offers ☎ 0171 281 5461

Help wanted

■ **Multimedia people!** I am studying for my MA in Birmingham and would appreciate examples of contemporary work, especially with use of music, for review. ☎ 0121 350 2600.

Thematic Groups continued

■ **Microsoft UG**: contact 'Enquiries' on 01252 834995

■ **Multimedia UG**: contact Richard Hurley on 01273 834588

■ **Newton MessagePad West Yorks User Group**: contact David on 0113 278 0691

■ **PageMaker UG**: contact David Foster on 01509 415101

■ **QUAD Club (QuarkXPress)**: contact Philip Caplan on 0181 523 4233

■ **School Mac**: Gloucestershire. Contact Bill Henley on 01453 825422

■ **School Mac UG**: Cambridge. Contact Derek Smith on 01945 584146

■ **Special Needs UG (SNUG)**: contact Geoff Hughes on 01744 24608

■ **The British IIGS UG**: contact Peter Stark on 01223 838231

■ **Young Mac**: call 01795 535472

Others

Advertise your user group here. It need not be formalised or registered, but must be a bona-fide non-commercial user group – just send us your details and we'll do the rest for you. Don't forget to include a contact number or address.

■ **Artists archive and news service**: contact The Research Station on 0181 778 6547 (24 hours) 38.4bps plus Web site at http://www.metamute.co.uk/r_station

■ **MacLin, E-lans MUG**: meetings every other Tuesday, bimonthly newspaper, for info call +46 (0) 141 220330 or e-mail omar@motala.mail.telia.com

■ **MacHelp**: non-profit helpbank for all your Mac problems. Write to : MacHelp – Hermelynster 10, B2610, Wilryk, Belgium, for advice and shareware.

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Inside: Huge image manipulation feature; tests of scanners and digital cameras; *Let's KISS* spreadsheet.

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Disk: 16 System enhancers; *FlipSide.*
Inside: Text manipulation; 15- and 17-inch monitors tested; speakers tested; multimedia music titles.

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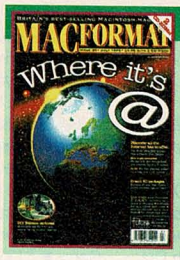

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Inside: Discover the Internet; *Extreme 3D, Ray Dream Studio, PhotoDeluxe; Spycraft, Flight Unlimited* reviewed.

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Issue 38 – June 1996

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Disk: Print utilities; freeware fonts; *Flippers; Biorhythms; Munchies.*
Inside: Perfect printing made easy; colour printers reviewed; *Live Picture 2.5; xRes 2.0; Bryce 2.*

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Issue 37 – May 1996

Free MacGamer supplement!
CD-ROM: Guide to upgrading your Mac; *Full Throttle, InfoGenie* demos.
Disk: Guide to Mac upgrades; *Quark* game; *SimpleBackup; Fly Swatter.*
Inside: Giant fold-out Mac family tree; Mac upgrades; *Illustrator 6.*

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Issue 36 – April 1996

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Issue 35 – March 1996

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Inside: Mac service; natural media; *PageMill;* foreign files; *Marathon 2.*

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Issue 34 – February 1996

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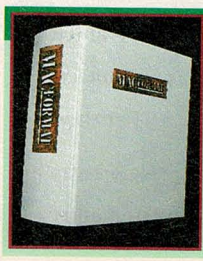

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Winners

Announcing the lucky winners of recent competitions...

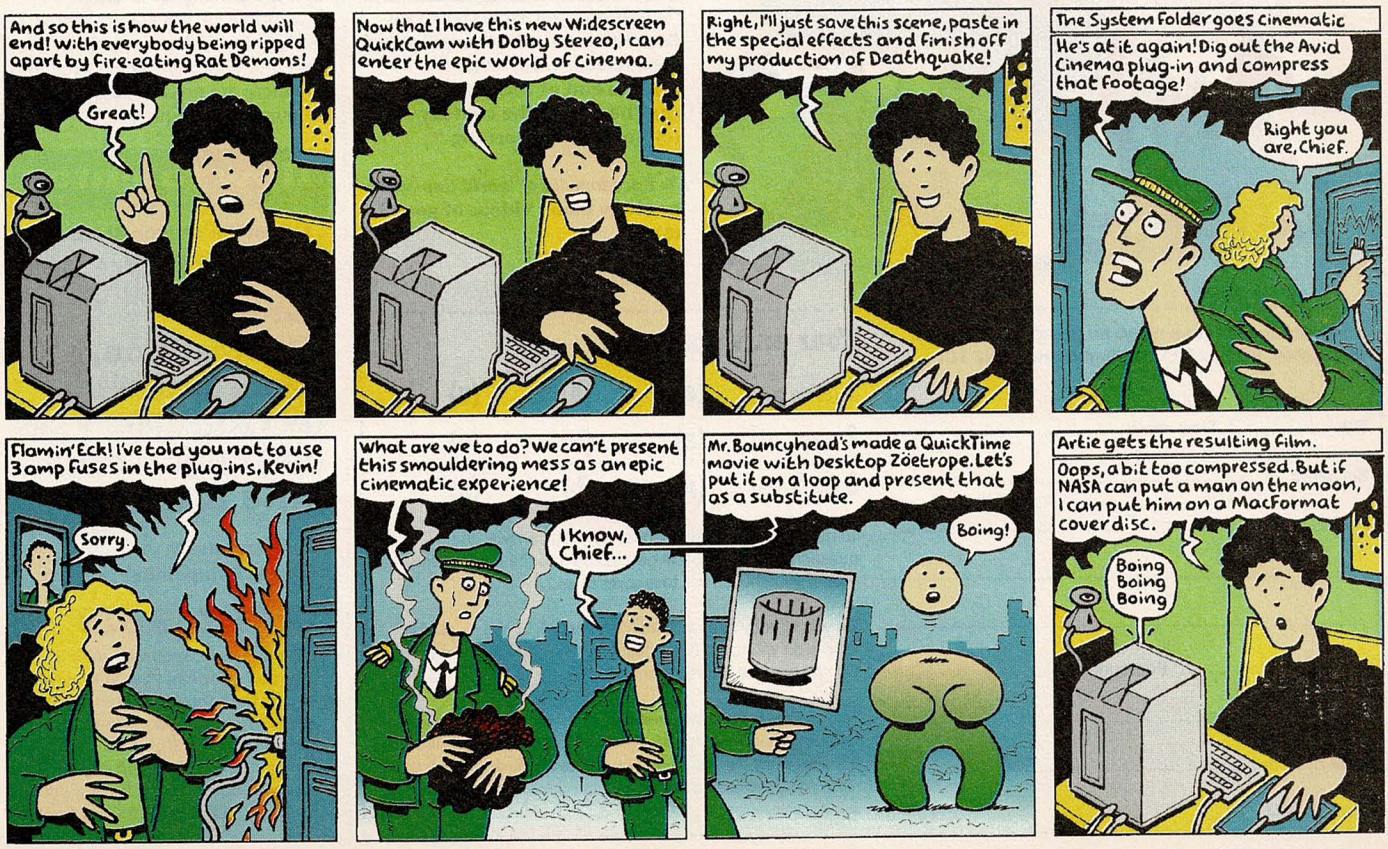
Back in MACFORMAT 42, we gave you the chance to win one of two Iomega Jaz drives, each complete with a 1 gigabyte cartridge, or one of two runners-up prizes of Iomega Zip drives with 100Mb cartridges, courtesy of leading retailer The Mac Zone.

These innovative storage technologies combine space with portability – when you've filled up one cartridge, simply pop it out and replace it! What's more, the Jaz drive's speed of access is comparable to the speeds you'd expect from a hard drive, making it perfect for backing up data or transporting large documents.

The lucky winners whose names were drawn from the bulging cardboard box are Mark Richards of Haverfordwest, Pembrokeshire, and Jack Foley of Hamilton in Lanarkshire. Your Jaz drives are on their way to you! The two runners-up, who each win a gorgeous Zip drive, are Valerie Campbell-Harding of Andover in Hampshire, and the sadly first-nameless S Ramsay of Great Sutton, South Wirral. Congratulations to all! **MF**

The Classic System Crew

by Bob Lynch


And so this is how the world will end! with everybody being ripped apart by fire-eating Rat Demons!
Great!
Now that I have this new Widescreen QuickCam with Dolby Stereo, I can enter the epic world of cinema.
Right, I'll just save this scene, paste in the special effects and finish off my production of Deathquake!
The System Folder goes cinematic
He's at it again! Dig out the Avid Cinema plug-in and compress that footage!
Right you are, Chief.
Flamin' Eck! I've told you not to use 3 amp fuses in the plug-ins, Kevin!
Sorry.
What are we to do? We can't present this smouldering mess as an epic cinematic experience!
I know, Chief...
Mr. Bouncyhead's made a QuickTime movie with Desktop Zoetrope. Let's put it on a loop and present that as a substitute.
Boing!
Artie gets the resulting film.
Oops, a bit too compressed. But if NASA can put a man on the moon, I can put him on a MacFormat cover disc.
Boing Boing Boing

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Try some Grolier titles in the **Demos** folder

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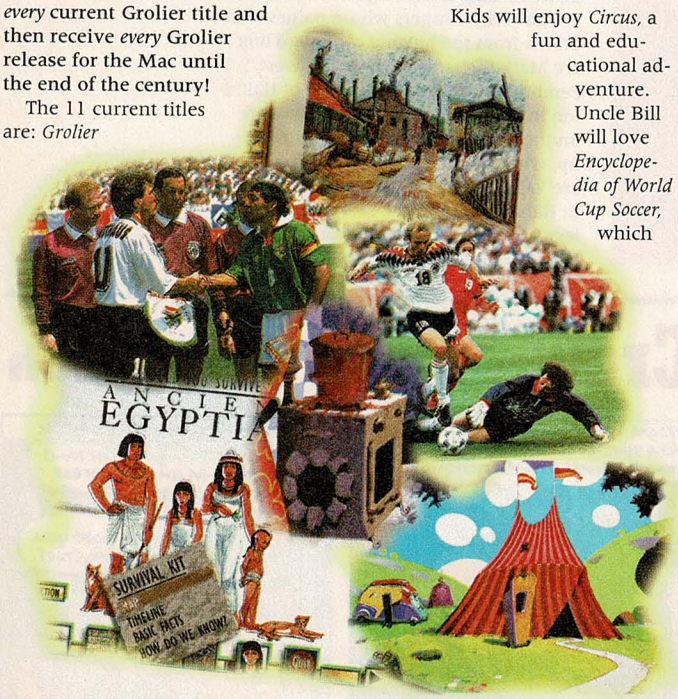
The 11 current titles are: *Grolier Multimedia Encyclopedia '97, Guinness Disc of Records, Encyclopedia of Sci-Fi, Elle Cookery Cards, Circus, Encyclopedia of World Cup Soccer, How Would You Survive?, My First Trip Around the World, 20th Century Art, Prehistoria,* and the brand new *Picasso*.

Kids will enjoy *Circus*, a fun and educational adventure. Uncle Bill will love *Encyclopedia of World Cup Soccer*, which recalls the history of the World Cup from 1930 to 1994 – and contains 85 video sequences of goals. Dave the gardener will be rapt in *20th Century Art*, with over 1,000 works to view. And Bonzo will love *How Would You Survive?*, which enables you to experience what life was like for an Aztec, Viking or Egyptian.



Grolier titles are available at your favourite Mac software retailer, and there's currently a great "buy one, get one free" offer on most of the Grolier Interactive range – look for the special stickers on the boxes. Or you can win the lot, plus every title till the end of the century!

Simply answer the easy questions below, then enter by mail or phone. The closing date for entries is Friday 10 January 1997.

The questions

1. This competition gives you the chance to win every Grolier Mac release until when?
(a) The end of the week
(b) The end of the century
(c) Tomorrow morning

2. *Encyclopedia of World Cup Soccer* has how many videos of goals?
(a) 11
(b) 85
(c) 1,930

3. *How Would You Survive?* enables you to experience life as an Aztec, Viking and what else?
(a) An Egyptian
(b) A hedgehog
(c) A carrot

The rules

1. Grolier undertakes to send a copy of every Mac OS product it releases by 31 December, 1999 to the winner. Grolier is under no obligation to develop or release a minimum number of Mac OS products.
2. The winner accepts full responsibility for notifying Grolier of any address change.
3. Entries to be in by midnight on Friday 10 January 1997.
4. Employees of Grolier, Future Publishing Ltd and associated companies, their agents, and their families, are not eligible to enter.
5. Multiple entries are not allowed.
6. The editor's decision is final, no correspondence will be entered into and there are no cash alternatives. No purchase is required. **MF**

How to enter

1. Post the coupon at left (or a photocopy) to

Grolier Competition, MACFORMAT, PO Box 700, Wellingborough NN8 1CL

2. Alternatively, dial the Grolier Competition Hotline:

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(The lines are open 24 hours a day, and your call should take no longer than three minutes. Calls are charged at 45p per minute cheap rate and 50p at all other times. You will have the opportunity to opt out from having your name included on a mailing list.)

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Surname .....

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Daytime telephone .....

Date of birth ..... **Sex:** .....

Mag code: MCF

Your answers

1 (circle one) **(a)** **(b)** **(c)**

2 (circle one) **(a)** **(b)** **(c)**

3 (circle one) **(a)** **(b)** **(c)**

To help us improve the magazine, please answer the questions below. You will be entered into the competition even if you choose not to answer them.

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ABC **MACFORMAT's circulation is independently audited by the Audit Bureau of Circulations**
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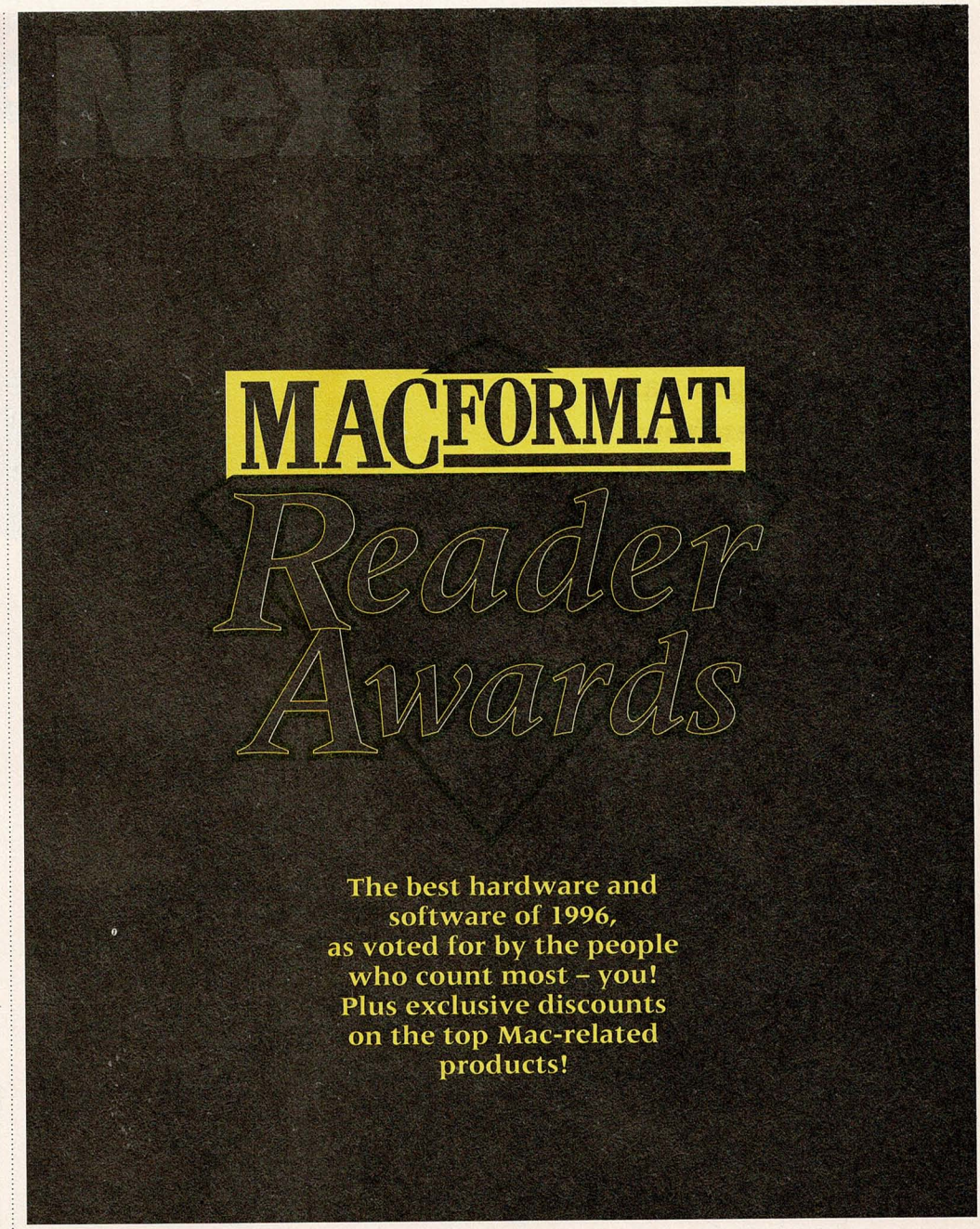
A cut above... The Tiny Zone!

Hello and welcome again to Tiny Zone, the section of MACFORMAT that's ever so slightly slighter this issue. It's all down to cost cutting, you see... But hey, isn't it great to see Apple working smarter ("not harder") to keep costs down? I mean, the PowerBook 1400 series are more powerful than the 5300 range, share many of their features, yet are up to 40% cheaper. How?? Apple UK's PowerBook Product Manager Peter Lunn says it's down to two factors. First, huge leaps in flat-screen technology over the last year or so have brought the price of LCD screens down dramatically. But there's also the new PowerBooks' industrial design. Apple worked closely with its suppliers to replace notoriously expensive custom-made components with standard off-the-shelf alternatives – hence IDE hard disks and ATAPI CD drives. Apple simply said to them, "This is what we want to do; what have you got that will do the job?" It's meant compromises, sure – but it's slashed production costs almost in half. If that means you can afford that sexy PowerBook at last, are you going to argue?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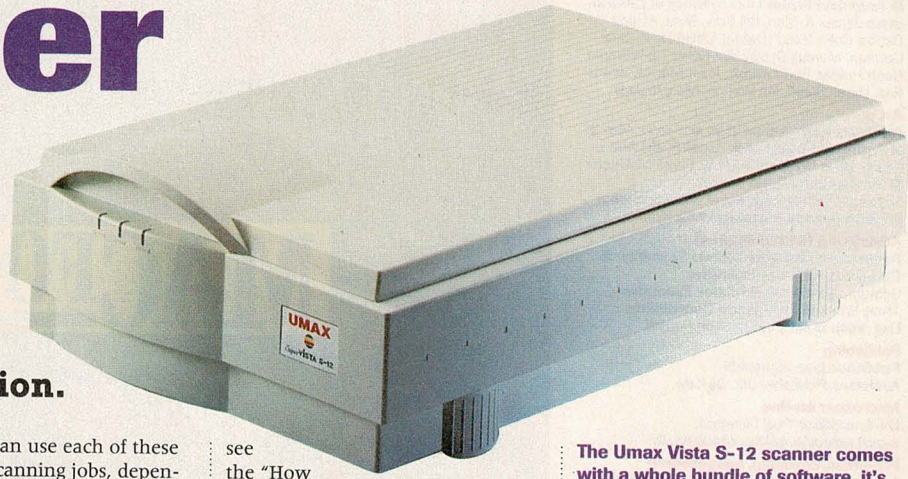
Plus

- How you and your Mac can get on in an office full of PCs – software and hardware PC-compatibility solutions
- The ten most common Mac problems solved
- Create a super-fast hard disk array for next to nothing
- Fractal Design Detailer, MeshPaint 3D, and quite possibly FreeHand 7.0
- Marathon Infinity! Descent II!
- How to get QuarkXPress colour trapping right every time
- The top Mac buyer's guide, the best second-hand ads, and much more!

MACFORMAT 46 goes on sale on Thursday 19 December. Reserve your copy with your newsagent now, or see page 99 for our special subscription offers

Win a Umax S-12 scanner

Got the scanning blues? This is your chance to win an A4 single-pass colour scanner from Umax, list price £934, courtesy of IMC Distribution.



The Umax Vista S-12 scanner comes with a whole bundle of software, it's high on quality and fast in speed – and it could soon be yours!

The Macintosh is famed for its graphics and image editing capabilities. The only catch is, how do you get just the right images into your Mac in the first place? You could, of course, search through the many fine clip photo collections now available... or you could draw, paint or even copy the image you want, then scan it in. And for that, you want a top-quality full colour scanner.

The Umax Vista S-12 is a single-pass flatbed scanner with an optical resolution of 600 x 1,200 dpi. It is capable of scanning full-colour images of up to A4 size at ultra-quick speed, and with software interpolation (where some clever software "fills in the spaces" between the dots that the scanner is optically capable of detecting) it boasts an enhanced resolution of 9,600 x 9,600.

What's more, you also get a whole bundle of software with the S-12, including *VistaScan*, *PhotoPerfect*, *PageManager* and a *Photoshop* plug-in. You can use each of these for different scanning jobs, depending on your needs.

The Binuscan *PhotoPerfect* software is a powerful program for automated colour correction and batch-scanning. *VistaScan* is a more user-friendly alternative for the scanning beginner which can also make use of the *Photoshop* plug-in provided, even if you don't have *Photoshop*. Finally, *PageManager* can be useful for managing all your scanned documents. It can edit imported text and picture files as required, and it has OCR (Optical Character Recognition) built-in – so that once pages of text are scanned in, they can then be easily converted to editable text.

When we reviewed the Umax Vista S-12 in MACFORMAT 44, it earned an impressive MACFORMAT rating of 86%. The S-12's list price is around £934 (inc VAT), but you could win one right here, simply by answering three easy questions. Then all you have to do is send us your answers by mail or phone – see the "How to enter" box for details. The closing date is Friday 3 January 1997.

The questions

1. What is the *optical* resolution of the Umax Vista S-12 scanner? (Think carefully!)
(a) A4
(b) 600 x 1,200 dpi
(c) 9,600 x 9,600

2. Which of the following does the included *PhotoPerfect* software *not* do?
(a) Automated colour correction
(b) Batch-scanning
(c) Start your car on cold winter mornings

3. *PageManager* has OCR built-in. What does OCR stand for?
(a) Optical Character Recognition
(b) Optional Code Response
(c) Ordinarily Crisp Reading

The rules

1. You must send us your entry by midnight Friday 3 January 1997.
2. Employees of Umax, IMC Distribution, Future Publishing and associated companies, and their agents, together with their families, are not eligible to enter.
3. Multiple entries are not allowed.
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MACFORMAT

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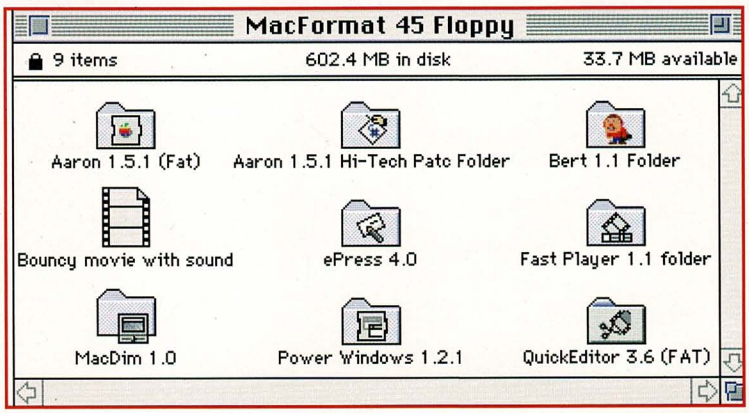
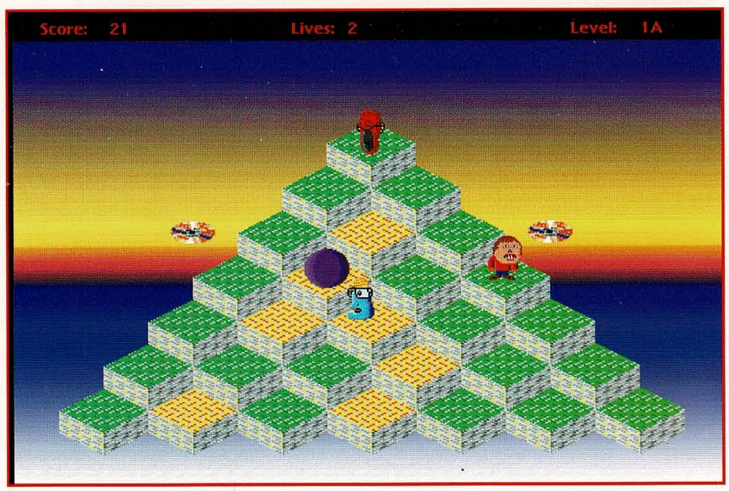
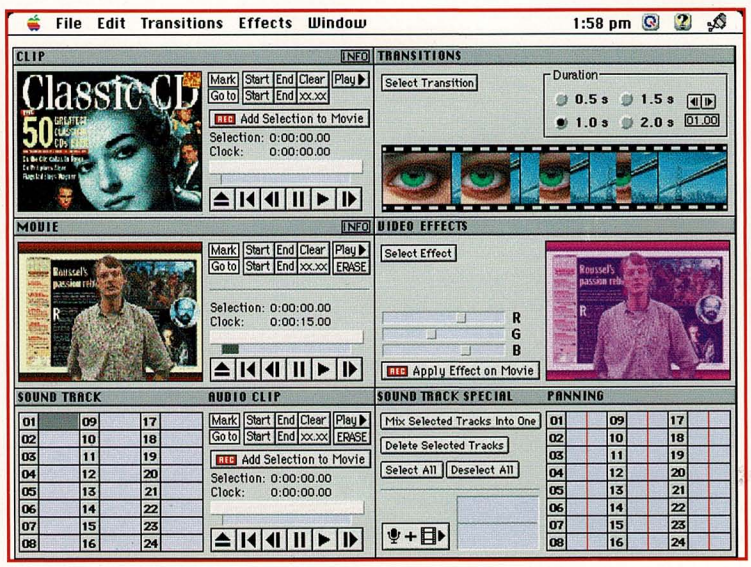
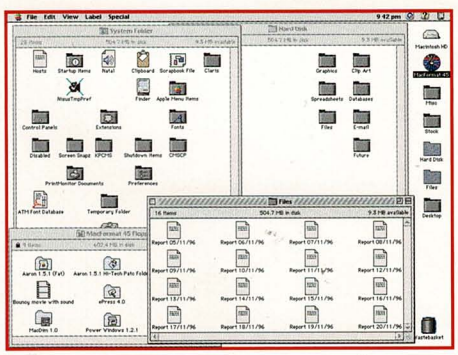




Relive all the fun of the arcade classics of years gone by with *Bert*.



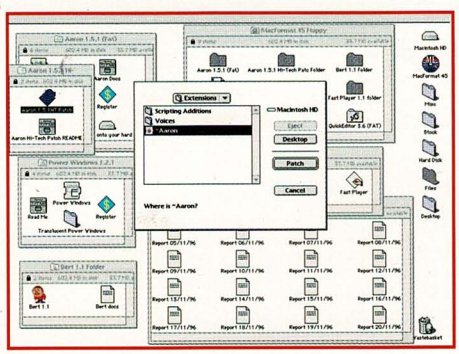


Finder enhancers

Give your Mac the look of System 8 right now with Aaron – even the optional "Hi-Tech" look is included.

■ MacDim: the only screensaver you'll ever really need – on newer Macs, it can even power down your monitor to help save energy.

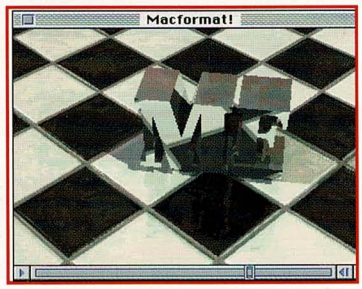
■ Power Windows – don't just drag a dotted outline, drag the real window!



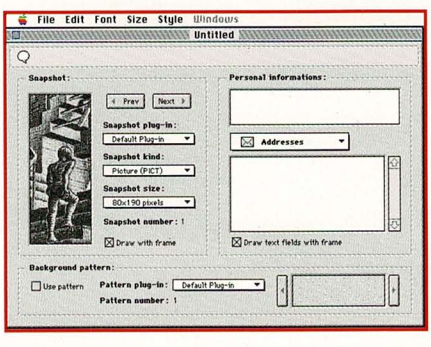
FastPlayer can play QuickTime movies...

QuickEditor 3.6

Try desktop video editing and effects for yourself with this fully-functioning shareware application. Effects plug-ins and a full guide are included, and so is Mr Bouncyhead... a sample movie to show you how easy it can be!



(Because of space restrictions, Quick-Time clips are not included on this disk.)



ePress 4.0

Create electronic business cards that you can distribute by e-mail, the Internet, or any way you like!

■ *ePress* requires System 7 and the Thread Manager Extension (it's part of System 7.5, or is available separately from Apple)